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# UNIVERSITY OF TORONTO

# REPORT OF THE DEAN

OF THE

# FACULTY OF MEDICINE

*Session 1954-1955*

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# *Report of the Dean of the Faculty of Medicine*

There continues to be much discussion, both in committee and conferences and in the literature, on methods and principles of medical education. Although greater facilities of communication are partly responsible, as indeed they are for the plethora of spoken and written comment on nearly every field of human interest, much of the commentary on medical education does result from serious consideration of the increasing complexity of the problem, in the light of tremendous increases in medical knowledge in the last half-century. Recognition of various specialized fields, and the long postgraduate training required for proficiency in them; the increasing need for sound basic training in chemistry and physics; the constant danger of pure science edging out the human approach; the increasing influence of medicine in relation to social and economic planning—these are some of the factors which are constantly in the minds of medical educators and will be gradually reflected in the undergraduate curricula of the modern medical school.

And yet the most comprehensive planning of undergraduate medical education will fail if at some stage, preferably throughout the entire course, the student is not impressed with the importance of sound moral values. The Chancellor of the University of Alberta, Dr. E. M. Scarlett, a graduate of this school, writing on "Tangibles and Intangibles in Medicine" refers to Osler's belief that medicine in itself is a way of life. He continues, "In medicine every decision is an act of faith, and faith is apt to lose its cutting edge if it is not held firmly in the shaft of a creed. Our creed as physicians has been forged by the labours and dreams and devotion of generations." The President of Dartmouth College writes of the same problem in general education under the title "Competence and Conscience." Truly the task of planning and accomplishing the ideal education for a selected group of young medical students is a responsible task. This fourth dimension, this maintenance of moral values, this constant striving for the first-rate, encompasses principles that are best taught by example rather than precept.

It is the aim of this school to give in four years a foundation for the growing number and variety of obligations which will face the physician of tomorrow, whether it be in the role of family physician, researcher or specialist practitioner in any of a score of different fields demanding ever increasing knowledge of new methods of diagnosis and treatment. It must be remembered that the doctor in many instances is asked for guidance and advice in socio-political problems. He works with others in attempts to gauge the effect of retirement at various ages on health, on the social problems of the aging and the aged, on the relation of mental health to crime, the basis of accident proneness, noise in industry in relation to health. All these are examples of the ever increasing range of the physician's interests.

Two committees have been working during the academic session, one on a review of the premedical curriculum, and the other on certain aspects of the professional course. The committee found that on the whole the premedical course was satisfactory. The list of reading in the English courses was reduced slightly, the laboratory courses in physics and chemistry were revised. In the professional course, the teaching of preventive medicine was rearranged to allow for closer integration with bacteriology, medicine, obstetrics and psychiatry. Lectures in the final year are limited to the one hour from 12 to 1, so that all the remainder of the student's time is free for practical work on the wards and in the laboratories. There will be two afternoons free for ward work in psychiatry.

That a student who spends four years in a medical course is scarcely ready for practice has been recognized for many years, and 99 per cent of the graduates have immediately undertaken a year of interneship. This necessity is now recognized by the state and after 1958 a medical graduate will only be able to obtain a licence to practise if he produces a certificate of his having completed a year of interneship in a hospital which is approved by the College of Physicians and Surgeons of Ontario.

All of which reminds me of the fact that our school has since 1928 granted to each student, on the successful completion of the undergraduate course, the degree of Doctor of Medicine. I am told that the Senate was asked at that time to fall in line with other Canadian and American universities and grant an M.D. because our graduates, particularly in the United States, were having some difficulty in convincing their local societies that an M.B. denoted an adequate education in a good school. The Bachelor's degree is of course the first degree in all other university courses, and the doctorate indicates further special study—indeed in most instances, a long period of study and very special knowledge in some particular field. No longer can it be argued that doctor in medicine has come to mean a licensed practitioner. Even that usage will be deferred at least one year beyond graduation. It was interesting to note on the occasion of the Medical Convocation in June, when 152 students came up for their degree, and when according to custom, the University offered the M.D. to those members of the class of 1905 who had not availed themselves of the opportunity of procuring it for a nominal fee, that a large number of that class declined the degree on the grounds that it now has ceased to be any special mark of distinction, wisdom or attainment when it is given at the end of a basic course. It is noted that Dalhousie within two years will cease conferring the degree of C.M. which it has been giving in association with its M.D. Perhaps the Canadian universities might well review the question of the degree which should properly be conferred at the completion of the basic course in medicine.

Speaking of convocations, this year's ceremony, coming as it did at the beginning of the combined meetings of the British and Canadian Medical Associations, was marked by the conferring of honorary degrees on six distinguished physicians: Dr. T. C. Routley, the President elect of the British Medical Association and the Canadian Medical Association; Sir John McNee, the Past President of the British Medical Association; Dr. G. F. Strong, the Past President of the Canadian Medical Association; Dr. E. A. Gregg of London, the Chairman of the Council of the British Medical Association; Professor Stanley Graham, Professor of Child Health in Glasgow, one of our own graduates; and Dr. W. P. Warner, the Director General of Treatment Services, Department of Veterans Affairs at Ottawa. Sir John McNee addressed Convocation.

The Alumni programme had included a dinner in Hart House on the night preceding Convocation. A large number of the graduating class and some 35 members of the class of 1905 were the guests of the Association. The Alumni Association Scholarship was presented by Dr. E. J. Clifford. Dr. M. H. V. Cameron spoke for the class of 1905.

The Alumni Association has again increased its scholarship and bursary aid, the total amount given in the past session being $2,300 exclusive of loans from a special fund. This year saw the completion of the new Common Room in the Medical Building. It was opened officially at a pleasant and informal luncheon hour ceremony, when Dr. Wallace Duncan, accompanied by Mrs. Duncan, unveiled a plaque in memory of his father, the late Reverend George P. Duncan. It will be remembered that Dr. Wallace Duncan had contributed the funds which made possible the rehabilitation of the Common Room. He has also continued to contribute most generously to the Mary and Wallace Duncan Fund in Orthopaedic Surgery.

The Alumni Association now has its office in the Medical Building. The first two numbers of the *Medical Graduate* have been circulated and the Association continues to afford the strongest support to the school.

*Finances.* I have commented in previous reports on the need for greater financial aid to the clinical departments. It is gratifying to report that in the budget for 1955–6 there is a modest increase in the budgets of Medicine, Surgery, and Psychiatry, to provide in each case for the salary of a young trained clinician who will give the larger part of his time to teaching and clinical investigation. In the Department of Obstetrics and Gynaecology similar arrangements are possible

through the gift of the late Gordon Leitch. In his will Mr. Leitch bequeathed to the University sufficient stock to ensure an annual income of $25,000, on condition that the Chair should be endowed in perpetuity, and the balance used in the best interests of the Department. It was also understood that this sum should not decrease the previous financial support from university funds. The University has decided that the chair shall hereafter be known as the Gordon Leitch Chair in Obstetrics and Gynaecology.

The school has derived much of its support for research and investigation from government and other granting bodies, and from private foundations. The individual departmental reports on research and the long lists of publications will bear witness to the breadth, diversity and significance of the research, and to the enthusiasm with which investigation is proceeding in varied fields of medicine and its allied sciences. The school acknowledges gratefully financial support from the National Research Council, Defence Research Board, Department of Veterans Affairs Research Fund, National Cancer Institute, Ontario Cancer Society, Ontario Cancer Treatment and Research Foundation, Atkinson Charitable Foundation, Advisory Committee on Scientific Research of the University, J. P. Bickell Foundation, McLean Foundation, Canadian Life Insurance Officers Association, Ontario Heart Foundation, Canadian Arthritis and Rheumatism Society, National Health Grants, and many private bequests. The R. S. McLaughlin Foundation has furnished support for several young teachers who have gone abroad to visit great centres in Europe and the United States before coming back to assume responsible teaching positions in the school.

*Buildings.* The steel for the new building at the Toronto General Hospital is nearly complete. Within two years at least part of the new structure will be in use. The new clinical and research buildings at the Western Hospital are complete and plans are in hand for a Rehabilitation Unit. The rebuilding and improvements to St. Michael's Hospital are nearly finished, and the students in the past session have had the advantages of the new out-patient department and student laboratories. The steel is raised for the central Cancer Treatment and Research Institute adjacent to the Wellesley Hospital. The west wing of the fifth floor of the Banting Institute has been redesigned and equipped as a central animal operating establishment. The second floor of the old Medical Building is undergoing alterations to afford increased laboratory space for the departments of Biochemistry and Pharmacology. The costs of maintenance and renovation of laboratory space and facilities are appalling. Here it is difficult to find support from granting bodies. It is gratifying that those responsible for the administration of the University recognize such necessary and inglorious demands, and have made it possible to provide from a hard-pressed budget some funds for alterations and rehabilitation.

*Appointments and retirements.* Professor J. K. W. Ferguson, who has directed the Department of Pharmacology for ten years, goes to the Directorship of the Connaught Laboratories. Our good wishes go with him in this challenging assignment. He will remain as a member of the Department, and will advise in its direction until the selection of a new head.

We were very happy that Professor William Boyd, on his return to Toronto from the University of British Columbia, has found time to give a series of lectures on the Humanities in Medicine in association with Professor Wasteneys. This year Professor Boyd will continue the series under the title "The Development of Modern Medicine." The lectures are given in the second medical year.

The school lost a great leader in public health in the death of Professor Donald T. Fraser, the head of the Department of Hygiene and Preventive Medicine. Dr. Milton Brown has been appointed Professor and Head of that department. He brings to the chair long experience in teaching and research, as well as in administration. During the war he served as Director of Hygiene for the Canadian Army Overseas. Reference has been made to the plans for closer integration of the teaching in preventive medicine with other departments. Under Dr. Brown's chairmanship there has

been established a President's Committee to study the controversial question of increasing basic radiation and its possible long-term biological effects.

The Faculty of Medicine lost a valuable teacher and an enthusiastic investigator in the field of heart disease in the death of Dr. Harold Rykert. In spite of increasing disability in the last six years of his life, he continued to carry on his teaching, his practice and his investigations with the same vigour and interest for which he had been known to his friends and students since he himself was an undergraduate in this Faculty.

Dr. Donald Solandt, another brilliant teacher and research worker, died at an early age after several years of failing health. He will be sadly missed in the special fields of physiology to which he had contributed so richly in the earlier years of his career.

Dr. Donald Low retires from the active teaching staff in Obstetrics and Gynaecology after many years of devoted service to the Faculty and the Toronto General Hospital. Dr. William Dafoe also retires from that department, where he has given notable service in building up a teaching unit at the Wellesley Division of the Toronto General Hospital. In Surgery, Dr. John McDonald, the head of the service at the Wellesley Division, and Dr. Charles Harris, a senior surgeon at the Toronto Western Hospital, are both retiring. Both these men will be remembered by generations of students and house surgeons with whom they have worked. All of those who are retiring are vigorous and active, and we know they will retain an active interest in the school, particularly in postgraduate teaching.

*Honours.* Professor C. S. Hanes received the Flavelle Medal of the Royal Society of Canada. Professor J. D. Hamilton was a Visiting Professor at the School of Medicine, University of Arkansas, in April. He was also elected President of the Canadian Association of Pathologists. Professor J. K. W. Ferguson was appointed Chairman of the Medical Advisory Board of the Alcoholism Research Foundation of Ontario. He has resigned his position as Head of the Department of Pharmacology in order to take up his new appointment as Director of the Connaught Medical Research Laboratories.

Professor P. E. Ireland is President-Elect of the American Rhinological, Laryngological and Otological Society, and Dr. K. C. McAskile has been elected to Fellowship in that Society. Dr. G. A. Henry was elected a Fellow of the American Broncho-Oesophagological Society, and Dr. J. Brydon Smith a Fellow of the American Academy of Ophthalmology and Otolaryngology. Dr. D. E. S. Wishart was President of the American Otological Society.

Dr. R. Ian Macdonald and Dr. J. C. Richardson were elected to Fellowship in the Royal College of Physicians of London, and Dr. Wm. A. Oille to Fellowship in the American College of Physicians.

Professor Charles Best was appointed Croonian Lecturer of the Royal Society of London; elected to the Board of Scientific Directors of the Roscoe B. Jackson Memorial Laboratory, Bar Harbor; awarded the Howard Reber Medal of the Philadelphia Metabolic Association; and named a Member of the Pontifical Academy of Sciences. Dr. E. A. Sellers was appointed Chairman of the R.C.N. Personnel Research Committee, and Adviser on Medical Research and Development to the Medical Director General of the R.C.N.

Professor A. C. Singleton was re-elected a member of the Board of Chancellors of the American College of Radiology, and Dr. K. F. MacEwen was elected President of the Ontario Association of Radiologists. Dr. A. T. Jousse was appointed consultant to the School of Physical and Occupational Therapy, Université de Montréal.

Professor W. E. Gallie was awarded an Honorary Fellowship in the Royal College of Surgeons of Edinburgh on the occasion of the 450th anniversary of the founding of the College. He was also invited to serve for one week as Visiting Professor of Surgery at the University of Edinburgh.

Professor R. M. Janes was elected to Honorary Fellowship in the Royal College of Surgeons of England. He was President of the Canadian Society of Clinical Surgeons during the past year. Dr. J. L. McDonald served as President of the Canadian Orthopaedic Association. Dr. F. G. Kergin was appointed Hunterian Professor of the Royal College of Surgeons of England. Dr. Burns Plewes was elected a Fellow of the American College of Surgeons.

Dr. J. A. MacFarlane was admitted to the Most Venerable Order of the Hospital of St. John of Jerusalem in the rank of Commander Brother.

*Graduate activities.* The Committee which directs the postgraduate activities of the Faculty has recommended to the Council that a Division of Postgraduate Studies be established. The increasing activities of the Committee will thus be more easily administered, and it is planned to issue a small bulletin giving the current information on various aspects of postgraduate work in the school. The usual intensive courses have been given, and the decentralized scheme sponsored by the Kellogg Foundation was carried on through the winter session at six different centres in Ontario. Some fifty-odd teachers contributed to the teaching programme, and it is estimated that in this way 150 doctors have the benefit of these day-long teaching seminars each month during the fall and winter.

*Division of Physical and Occupational Therapy.* This Division of the Faculty has had a very successful year. As the years go by, however, the war-time huts in which the Division is housed present increasing difficulties in maintenance and heating. A special committee chaired by Dr. A. T. Jousse is at present studying the possibilities, and particularly the need of a training course for workers in audiology and speech pathology.

*Visitors.* Mr. Milnes Walker of Bristol, England, gave the 26th Balfour Lecture; Dr. Ewen Downie of Australia, the Banting Memorial Lecture; Dr. A. Wiener of New York, the Phi Delta Epsilon Lecture. Sir James Learmonth was the 1954 Simms Travelling Professor of the Royal College of Surgeons of England, and spent a week in the school in the autumn. Sir Russell Brain, the President of the Royal College of Physicians of England, and Sir Howard Florey of Oxford also visited us during the academic session. These, and many other distinguished teachers from the United States and the British Commonwealth, have been a constant stimulus to both staff and students. Several physiologists from the U.S.S.R., delegates to the International Physiological Society meeting in Montreal, spent a day at the school and presented the Library with a complete set of the writings of Pavlov.

This report cannot include all the noteworthy features of the work in another active session of the school. The departmental reports, however, are full of interest and describe the activities in reasonable detail.

It is with grateful appreciation that the Dean again records the invaluable support of the secretarial staff, and also the pleasant and helpful co-operation of all the administrative officers of the university.

J. A. MacFarlane

## Publications

### OFFICE OF THE DEAN

MacFarlane, J. A. "The Canadian Forces Medical Council" (*Canadian Medical Association Journal*, vol. 71, no. 6, Dec., 1954, pp. 576–9).

# *Medical Society*

(September, 1954, to June, 1955)

| | |
|---|---|
| *Honorary President* | Dean J. A. MacFarlane |
| *Honorary Secretary-Treasurer* | Dr. K. J. R. Wightman |
| *Chairman* | Dr. G. Cameron |
| *President* | C. D. Anderson |
| *Vice-President* | W. S. Hunter |
| *Treasurer* | J. R. Hamilton |
| *Secretary* | Mrs. R. Herst |

The primary aim of any general student organization should be to augment the purposes of the university itself, that is, to provide facilities for and stimulate student interest in both academic and extra-curricular activities, which will lead to a well-rounded education for the future life as a graduate. In the Faculty of Medicine the organization which fills this need is the Medical Society, consisting of all undergraduate medical students and its governing body, the Medical Society Assembly. The members of the Assembly are elected annually by the student body and meet every two weeks throughout the school year to carry out these functions and correlate the activities of the various groups within the Faculty.

Many activities of the Society are traditional and vary little from year to year, but nearly every year some particular opportunity or need arises which stimulates the introduction of a new enterprise. This year with the completion of the Best Institute just such an opportunity arose, when space was made available in the Medical Building for the student Common Room which has long been needed for the preclinical years. With the help of a very generous gift from Dr. Wallace Duncan, a graduate of this Faculty, the University authorities refinished a laboratory vacated by the Physiology Department. The requests of the students regarding the details of its construction were taken into consideration, and the room was opened officially in the spring at a ceremony attended by Dr. Duncan and members of the staff and student body. The Medical Society provided furniture for the "Duncan Room" from a fund started some years ago, and also opened a snack bar which serves lunches and snacks throughout the day. This latter undertaking was extremely successful and greatly increased the use of the room. It is now a firmly established activity of the Society, controlled by the Warden, a newly created officer who has also been made responsible for the care of the Common Room in the Toronto General Hospital.

The *Medical Journal* this year also underwent major changes. Each issue of the *Journal* was devoted to a particular field of medicine and this, plus the enthusiasm of the editorial staff, stimulated considerably more student interest than in several years past. As a result there were many more student contributions than in previous years, one issue containing articles written by no fewer than nine students. This is certainly a step forward towards the goal of having as many students as possible avail themselves of the opportunity to organize material from the literature and present it in coherent form. The literary quality of the *Journal* is also confirmed by the fact that the circulation increased considerably over the past year.

A full social programme was again undertaken this year. It started early in the fall with the Freshmen's Reception held in Falconer Hall. Dr. Tovee as guest speaker made a hit with all the freshmen, who then enjoyed an evening of food and fun mixed with a few songs organized by Daffydilians.

Later in the fall an informal dance was sponsored jointly with the undergraduates of Physical and Occupational Therapy, who are also members of the Faculty of Medicine. Throughout the year an attempt was made to include this group in other activities wherever possible.

December as usual saw Daffydil, Medicine's annual show, staged at Hart House.

As always its preparation provided a common meeting place for students from all years and it again showed the way for other student productions on the campus.

The annual Medical At Home held in February at the Royal York Hotel drew a good crowd, members of which particularly enjoyed an interval of Scottish dances, an innovation which may eventually replace the entertainment, always a difficult problem with the poor acoustics of the Ballroom.

Following the example of last year's Assembly, a Staff-Student Smoker was held in the spring, with Dr. Markowitz as guest speaker. This function is obviously worth while and will in future be an annual event.

Throughout the year the Medical Arts and Letters Club organized debates and guest speakers, and sponsored the activities of the Medical Glee Club and Osler Society.

The Medical Society's activities are closely bound to those of various other organizations. The reports of the Medical Athletic Association and the Medical Women's Undergraduate Association will be found on the following pages. C.A.M.S.I., the Canadian Association of Medical Students and Internes, is also represented on the Medical Society. This year C.A.M.S.I. sponsored a panel on socialized medicine consisting of prominent men in the field, and also introduced new term life insurance for medical students at a very low rate, as well as providing weekly films on medical subjects and publishing its quarterly journal.

For the first time a separate officer was appointed as the Students' Administrative Council Representative. This was found to be a very satisfactory arrangement and the Medical Women's Undergraduate Association has decided to follow this example next year. Through the S.A.C. the Medical Society co-operated in such all-university activities as the SHARE Campaign, the Blood Donor Campaign, the Hart House elections and the Float Parade.

The year ended with the Medical Society elections at Hart House Theatre when the 1955–6 executive was chosen by the students. To Mr. William Hunter, the President of the Medical Society for 1955–6, and his executive, this year's Assembly extends its heartiest congratulations and best wishes.

C. D. ANDERSON

## *Medical Athletic Association*

(September, 1954, to June, 1955)

| | |
|---|---|
| *Honorary President* | Dr. J. C. B. Grant |
| *President* | B. R. Walker |
| *Vice-President* | J. R. Wilkes |
| *Secretary-Treasurer* | J. W. Hamilton |
| *Publicity Director* | W. J. Finlayson |
| *Quartermaster* | L. E. Soper |
| *IV Medical Representative* | N. L. Patt |
| *III Medical Representative* | E. P. MacDougall |
| *II Medical Representative* | J. T. Bate |
| *I Medical Representative* | R. C. Bull |
| *II Premedical Representative* | J. D. Morin |
| *I Premedical Representative* | R. L. Joynt |

During 1954–5 the Medical Athletic Association enjoyed one of the most successful years in the organization of an athletic programme for medical undergraduates. Both in interfaculty and intercollegiate sports participation was higher than in any previous year. This "joie de sport" helped win three intramural championships for our Faculty and was of valuable assistance in the attainment of two intercollegiate championships.

In the fall term the senior lacrosse and soccer teams were again successful, the soccer team reaching the semi-finals and the lacrosse team the quarter-finals. The football squad was a pleasant surprise, winning two games and losing four, several by close scores.

During the winter months the hockey and volleyball teams managed to do quite well. The volleyball squad (IV year variety) reached the finals before being eliminated, although the hockey team was defeated early in the final rounds. Later in the winter three interfaculty championships were won by the senior squash, fourth-year "A" basketball, and third-year waterpolo teams. Excitement during these days ran high in the Faculty, and both vocal and spiritual participation by the non-combatant members aided immeasurably in the excellent showing made by these teams.

In waterpolo eight teams represented Medicine, five reaching the quarter-finals. Dave Price, who is continuing the excellent work of Dr. Larry Rosen in organizing waterpolo within the Faculty, deserves a full share of the credit.

The senior swimming team was second in interfaculty competition. Our Faculty was third in the T. A. Reed Trophy race. Only five hundred points in some twenty-one odd thousand separated us from the leaders.

During the year several by-laws of the Association were revised.

The Medical Athletic Stick was awarded to Mr. B. R. Walker.

The year's activities were climaxed by the final banquet, when the awards were presented. Dr. J. C. B. Grant gave a very interesting and entertaining speech. A successful year is anticipated for 1955–6 with Mr. J. R. Wilkes as President.

B. R. WALKER

## *Medical Women's Undergraduate Association*

(September, 1954, to June, 1955)

| | |
|---|---|
| *Honorary President* | Dr. Marjorie Davis |
| *President* | Marjorie Swanson |
| *Vice-President* | Norma Seifried |
| *Treasurer* | Louise Chevalier |
| *Secretary* | Aileen Porter |
| *Social Convener* | Gloria Pierce |
| *Chairman, Common Room Committee* | Ruth Rudd |

In reporting on the activities of the Medical Women's Undergraduate Association, it must be borne in mind that this organization sponsors many activities for the undergraduate women, including social and athletic events. The organization also maintains Common Rooms in the Medical Building and the Toronto General Hospital.

On opening day the girls of the second premedical year met the incoming year, took them on a tour of the campus, and helped them with registration. In the evening the new members were entertained by the fourth medical year.

Initiation this year consisted of work done at St. Christopher House.

The annual Medical Women's Undergraduate Association banquet was held on October 26th at Casa Loma. Approximately 60 undergraduates and 20 graduates attended. Dr. Marion Hilliard showed many coloured slides of her recent European trip. They were much admired by everyone present.

At Christmas time the annual Buffet Supper was held and two large cartons of brightly wrapped gifts were collected for the children at the University Settlement.

For the first time this year members of the Association looked after the preparation of the food for the Daffydil party.

The annual party for the graduating class was held on March 29th at Falconer Hall. This was organized by the members of the third medical year.

The constitution was amended and a new position of representative to the Students' Administrative Council was created. This representative is to be elected from members of either the second or third medical year.

Coffee was made available in the Common Room in the Medical Building again this year until the opening of the new Duncan Room. A new study lamp was purchased for the Common Room in the Toronto General Hospital.

In the autumn the members were entertained by the graduates at a buffet supper at the home of Dr. Marjorie Davis and Dr. Geraldine Maloney, and in the spring at a tea held in the University Women's Club. The members of the organization appreciate the interest shown in them and their activities by the graduates.

The athletic programme under Marjorie Platts offered a wide range of activities.

The members of the Association at this time would like to thank Dr. Marjorie Davis for her interest and help as our Honorary President during the past year.

MARJORIE SWANSON

## *Medical Women's Athletic Association*

(September, 1954, to June, 1955)

| | |
|---|---|
| *President* | Marjorie Platts |
| *Vice-President* | Doris Kerr |
| *Treasurer* | Wilmer Inch |
| *Secretary* | Joan Atkinson |

Medical teams made a good showing again this year. The "A" basketball team tied for first place in its league, but lost out in the play-off to the team which went on to win the championship. The hockey team won all six games to capture the league title but was eliminated in the semi-finals. The "B" basketball, baseball, and volleyball teams reported enjoyable, if not winning, seasons.

In the fall Mary Robertson successfully represented Medicine in the interfaculty swimming tournament. A highly enjoyable skating party was held this winter with refreshments and entertainment at the home of Doris Kerr.

The athletic year ended with the annual M.W.A.A. banquet in March. Awards this year consisted of one Senior T, one citation to a Senior T, three Junior T's, one Third Colour, four Medical M's and three Premedical Bars. The speaker this year was Dr. Elizabeth Chant Robertson, who gave a most interesting talk about a trip she had once taken around James Bay.

MARJORIE PLATTS

## *Science-Medicine Division of the University Library*

*Reported by Miss M. M. Slater and Mrs. M. Galt*

This has been the year of the Library's "Great Move," and in spite of the fact that approximately 50,000 volumes were transferred from the Medical Reading Room to new quarters on the first two floors of the old library stack, service was suspended for only three days.

During the first six months after the move into the Science and Medicine Division several encouraging trends have been evident. The most obvious improvement is in the increased space, light, and air available for the collection. This is particularly true in the case of the more than 400 current medical periodicals which, for the first time, have adequate space for their proper display. There has been a

noticeable increase in circulation of this material, and the close proximity of other scientific journals has been very useful.

Medical students have made good use of their stack privileges and should derive increased benefit from this arrangement.

Material previously in storage such as old runs of medical periodicals, theses, and duplicates, as well as sets returned from the Department of Pathology are being fitted in on the second floor. It is hoped that the entire Science and Medicine Division stack will be in order before the end of the summer.

A large shipment of duplicate books and periodicals was sent to the Korean National Libraries through UNESCO.

Friendly co-operation between our library and other medical collections in Toronto has continued, and there has been an increase in services to hospital libraries.

## FELLOWSHIPS, SCHOLARSHIPS, MEDALS AND PRIZES

*Awarded at Convocation, June, 1955*

### GRADUATE

| | |
|---|---|
| Graham Campbell Fellowship | H. J. Watt, M.D. |
| William Goldie Prize | R. L. MacMillan, B.A., M.D., M.R.C.P., F.R.C.P.(C). |
| Percy Hermant Fellowships in Ophthalmology | D. W. Harper, M.D.<br>R. D. Lawton, M.D., C.M.<br>M. Neveu, M.D. |
| Arch Hutchison Fellowship | K. R. Butler, M.D. |
| Minister of Health Gold Medal in Psychiatry from the Province of Ontario | P. A. Christie, M.D., C.M. |
| Alexander McPhedran Research Fellowship in Clinical Medicine | G. W. Fitzgerald, B.A., M.D. |
| O'Keefe Fellowship in Oto-Laryngology | T. Molony, L.R.C.P. & S., F.R.C.S.(C). |
| Starr Medal | S. J. Klebanoff, M.D. |
| Helen L. Vanderveer Fellowship | H. J. Watt, M.D. |

### UNDERGRADUATE

*Fourth Medical Year*

| | |
|---|---|
| Cody Gold Medal | Mrs. M. L. Cohen |
| Cody Silver Medal | G. S. Cohen |
| Cody Silver Medal | R. M. Ehrlich |
| Doctor Benjamin W. Appleton Prize in Psychiatry | A. Piotrowski |
| Butterworth Prize | C. D. Anderson |
| Chappell Prize in Clinical Surgery | J. D. T. Ainslie |
| Hendry Memorial Scholarship | Mrs. J. S. Bain |
| Medical Alumni Association Scholarship | R. M. Ehrlich |
| Ellen Mickle Fellowship | Mrs. M. L. Cohen |
| Ontario Medical Association Prize in Preventive Medicine | G. S. Cohen |
| Doctor Roy Simpson Scholarship in Paediatrics | *Aeq.* J. D. T. Ainslie<br>R. M. Ehrlich |

*Third Medical Year*

| | |
|---|---|
| Class of 1924 War Service Scholarship | W. H. Kerr |
| Doctor Benjamin Cohen Prize in Obstetrics | D. M. Jamieson |
| J. F. Hartz Company Prize | H. J. Hoffman |
| Ronald S. Saddington Medal in Pathology | T. Izukawa |
| Starkman Prize in Pharmacology and Therapeutics | B. Langer |

*Second Medical Year*

| | |
|---|---|
| John Copp Bursary | J. T. Bate |
| Posluns Brothers Scholarship | L. W. Organ |
| Sandoz Prize in Pharmacology | Miss B. Glozek |

*First Medical Year*

John Zoberman Scholarship . . . . . G. D. Blenkarn

*Second Premedical Year*

Famous Players Canadian Corporation Scholarship . . R. Kalinovski

## REGISTRATION OF STUDENTS IN THE FACULTY OF MEDICINE

SESSION 1955–6

| | |
|---|---|
| First premedical year | 129 |
| Second premedical year | 119 |
| First medical year | 162 |
| Second medical year | 125 |
| Third medical year | 145 |
| Fourth medical year | 151 |
| Art as Applied to Medicine | 7 |
| Physical and Occupational Therapy | 237 |
| Bachelor of Science in Medicine | 6 |
| Diploma in Medical Radiology | 12 |
| Diploma in Public Health | 11 |
| Diploma in Psychiatry | 27 |
| Graduate students (other courses) | 64 |
| | 1,195 |
| Advanced graduate course (Medicine, Surgery, Obstetrics and Gynaecology | 70 |

# *Anaesthesia*

*Under the direction of Professor S. M. Campbell*

The undergraduate training program of sixteen lectures in the third year and the clinical teaching in the fourth year was carried out as in the previous year. The course was reviewed and the Council have accepted a change whereby the number of lectures in the third year will be reduced to eight. Each student will then receive practical instruction in the administration of paediatric anaesthesia four afternoons at the Hospital for Sick Children. The fourth-year clinical teaching will not be altered.

The two-year postgraduate training course in Anaesthesia has been carried out successfully with the much-appreciated help of the basic science departments, as well as the Departments of Medicine, Surgery, Oto-Laryngology, and Radiology. During the past year, 16 have been taking the course and this number will be increased considerably July 1st next. In addition to the Toronto General, the Western, St. Michael's, the Hospital for Sick Children, and Sunnybrook, the following hospitals also participate in the training programme: the Toronto East General, the Women's College Hospital, and the Hamilton General.

We report with regret the retirements of Dr. Ralph Hargrave, Chief Anaesthetist of the Western Hospital, and Dr. Douglas Bastow, of the same Hospital, from the teaching staff after many years of faithful service. Dr. Rice Meredith becomes the new Chief of the Staff in Anaesthesia at the Western Hospital. We welcome the addition of Dr. Barry Fairley from the Brompton Hospital, London, England, to the teaching staff at the Toronto General Hospital.

### RESEARCH

Members of the staff have undertaken the following research work:

Dr. R. A. Gordon, with the assistance of Dr. Michael Campbell, is carrying out an investigation of the methods of control of intractable pain in carcinoma, with particular reference to the use of chlorpromazine and nerve blocking techniques. This research is supported by a grant from the Ontario Cancer Foundation Research Division. In association with Dr. W. Allemang of the Department of Obstetrics at

the Toronto General Hospital, Dr. Gordon is investigating the use of chlorpromazine as an analgesic agent in the first and second stages of labour.

Dr. S. T. Zeglen, at St. Michael's Hospital, has conducted a study on intravenous alcohol and its application to anaesthesia.

Professor Campbell and Dr. Shirley Fleming have assisted Dr. W. G. Bigelow at the Toronto General Hospital in the clinical application of hypothermia to cardiovascular surgery.

Dr. Code Smith has been working with Dr. William Mustard in the clinical application of hypothermia in cardiovascular surgery at the Hospital for Sick Children.

Dr. Stewart Vandewater has been collaborating with the Department of Neuro-Surgery at the Toronto General Hospital in the use of hypothermia for surgery of intracranial vascular lesions.

### Publications

Boddington, G. D. M. "Clinical Experience with Surital Sodium" (*Canadian Anaesthetists' Society Journal*, vol. 1, no. 2, Oct., 1954, pp. 104–12).

Campbell, S. M. "Anaesthesia in Thoracic Surgery" (*Surgical Clinics of North America*, Aug., 1954, pp. 1007–18).

Gordon, R. A. "Clinical Experiences with Hexylcaine Hydrochloride (Cyclaine)" (*Canadian Anaesthetists' Society Journal*, vol. 1, no. 1, July, 1954, pp. 19–23).

Gordon, R. A., Vandewater, S. L., Sleath, G. E., and Chaplin, D. "Study of the Value of Dimenhydrinate and Promethazine Hydrochloride in the Control of Post-Anaesthetic Vomiting" (*Canadian Anaesthetists' Society Journal*, vol. 1, no. 2, Oct., 1954. pp. 95–103).

Gordon, R. A. and Vandewater, S. L. "Largactil in Anaesthesia" (*Canadian Anaesthetists' Society Journal*, vol. 2, no. 1, Jan., 1955, pp. 23–31).

Gordon, R. A. and Shields, H. J. "Liquid Anaesthetic Agents"; in *"Anaesthesiology" by Forty American Authors*, pp. 248–73. Philadelphia: F. A. Davis, Co., 1954.

Marchant, Peter. "Hypercapnia" (*Bulletin of the Academy of Medicine*, Toronto, vol. 28, no. 5, Feb., 1955. pp. 114–17).

Zeglen, S. T. "Surital Sodium—a Clinical Trial" (*Ontario Medical Review*, vol. 19, no. 1, Jan., 1955, pp. 5–13).

## *Anatomy*

*Under the direction of Professor J. C. B. Grant*

During the year 1954–5 there were 674 undergraduate and graduate students working in the Department of Anatomy. They were distributed among the twenty-four courses mentioned below, as follows:

Undergraduate Courses in Gross Anatomy and Neuro-Anatomy:

| | | | |
|---|---|---|---|
| 1. | Medical, first year | 131 | |
| | Art as Applied to Medicine | 2 | |
| | Teachers' Course, Physical and Occupational Therapy | 2 | |
| 2. | Dental, first year | 74 | |
| 3. | Physical and Occupational Therapy, first year | 88 | |
| 4. | Physical and Occupational Therapy, second year | 90 | |
| 5. | Physical and Health Education, first and second years | 60 | |
| 6. | School of Embalming (Spring) | 70 | |
| 7. | Dental Hygiene, first year | 9 | |
| | | — | 526 |

Graduate Courses in Gross Anatomy:

| | | |
|---|---|---|
| 8. | M.S., F.R.C.S., Radiology, and Anaesthesiology (evening courses) | 34 |
| 9. | Ophthalmology | 14 |
| 10. | Oto-Laryngology | 6 |
| 11. | Dental Specialties | 2 |

| | | |
|---|---|---|
| 12. Demonstrators of Anatomy | 4 | |
| 13. Advanced Graduate Course in Surgery | 19 | |
| 14. Advanced Graduate Course in Obstetrics and Gynecology (Autumn) | 10 | |
| 15. Advanced Graduate Course in Obstetrics and Gynaecology (Spring) | 10 | |
| 16. Continuation Course for Graduates in Dentistry | 4 | |
| | — | 103 |
| UNDERGRADUATE COURSES IN HISTOLOGY: | | |
| 17. Medical, first year (included in item 1) 131 | | |
| 18. Dental, first year (included in item 2) 74 | | |
| 19. Physical and Occupational Therapy, first year (included in item 3) 88 | | |
| 20. Physical and Health Education, third year | 35 | 35 |
| | — | 35 |
| GRADUATE COURSES IN HISTOLOGY AND CYTOLOGY: | | |
| 21. Graduate Dental Histology | 6 | |
| 22. Graduate Histology | 1 | |
| 23. General Cytology (Graduate School) | 2 | |
| 24. Demonstrator in Histology | 1 | 10 |
| | — | — |
| | | 674 |

In the year 1947–8, the subdivisions of Anatomy (Gross Anatomy, Histology, Embryology, and Neuro-Anatomy), which previously had been taught during two years, were, for the first time, taught in one year. As was stated in our report for that year, this compression of the subject was much to be regretted, but no manipulation of the time-table allowed of any other arrangement in our four-year curriculum. The staff has always deplored this. It is hoped by staff and students alike that some means of introducing the subject of Anatomy during the second premedical year may be found—not in order that more Anatomy may be taught but that the students may be instructed in it over a longer period.

Dr. Sylvia H. Bensley introduced a new course in General Cytology in which members from three other departments participated. The course was attended by members of the Faculty, graduate students, and medical students.

In the laboratory work of this new course, Dr. Bensley and the students, with the help of Dr. Howatson and the technical staff, undertook the study of the effects of fasting on the cells of the liver, pancreas, and brain of the guinea-pig. These studies were made on fresh cells, on fixed cells in optical sections, and with the electron microscope. The most striking effects of fasting were seen in the mitochondria. These studies are being extended.

Classes in first- and second-year Physical and Occupational Therapy have been somewhat reduced this year. Four hours a week were allotted to Anatomy, each class being divided into four tutorial groups.

It is of interest that techniques for preparing the extremely thin sections which can be studied by electron microscopy have only been developed in the last two or three years; their use is leading to a great expansion of the subject-matter of microscopic anatomy. Our Department was most fortunate in having Dr. Howatson recently join our staff. Dr. Howatson, with the assistance of Mr. Robert Varvarande, is now carrying on a comprehensive programme of research by means of this new technique.

At the end of this year Dr. A. W. Ham, who has served as an honorary secretary of the Banting Research Foundation for eighteen years, and as the active one for the past several years, relinquished the active role to Dr. J. V. Basmajian of this Department, who will now carry on this work. The office of the Foundation will still be maintained in this Department.

Dr. J. V. Basmajian has been appointed a Research Associate to the Hospital for Sick Children.

During the summer of 1954 a group of eight students, under the direction of Dr. Basmajian, prepared many new and useful dissections.

Dr. K. K. Bhatt, Professor of Anatomy of the University of Baroda, India, spent four months with us as a Rockefeller Research Foundation Fellow.

## Research

Dr. J. V. Basmajian has expanded his electromyographic studies, using both the new equipment donated to the Department by the Bickell Foundation and the standard myograph at the Hospital for Sick Children. Dr. Basmajian has been proceeding with the following projects during the year:

(*a*) With Dr. A. Szatmari, an electromyographic study of the effect of chlorpromazine (Largactil) on human spasticity. They have established, for the first time, that this drug abolishes spasticity in most cases without affecting voluntary power. The effect seems to occur at the level of the reticular substance of the midbrain. These findings have met with a great deal of interest among neurologists, locally and in the United States.

(*b*) With Dr. W. B. Spring, an electromyographic study of the voluntary Sphincter Urethrae. A brief report of this work has been presented to the American Association of Anatomists.

(*c*) With Drs. W. A. Hawke and E. G. Murphy of the Hospital for Sick Children, a study of neuromuscular diseases of childhood including muscular dystrophy. Already considerable progress has been made and it is hoped that a much better understanding will be gained of these conditions and the underlying physiological disturbances.

(*d*) Studies of normal muscles. This is a continuation of a long-term project with volunteers as subjects.

With the assistance of a grant from the Banting Research Foundation, Dr. A. W. Ham, and Dr. W. R. Harris of the Department of Surgery, with the help of Dr. K. W. Hobson, have studied the growth and resorption of bone. Dr. Hobson and Dr. Ham have also made a study of the origin and nature of foreign body giant cells and osteoclasts and the relation of the latter to parathyroid hormone.

With the assistance of a substantial grant from the National Cancer Institute of Canada, cancer research has been carried on under the general direction of Dr. A. W. Ham. In particular, Dr. Allan F. Howatson, by preparing sections about one-millionth of an inch in thickness and examining them with the electron microscope, has shown that the fine structure of cancer cells differs from that of normal and embryonic cells of the same type.

During the year Mr. G. A. L. Ross has maintained transplantable tumours in rats, mice and chick embryos, and has provided supplies of these to many other departments, both here and in other cities, that are carrying on cancer research and have needed this type of experimental material.

It has been a pleasure to extend our cancer research facilities to Dr. M. I. Armstrong, and to Dr. A. W. Gray, who were both formerly associated with us, to investigate the possible effects of rhodotorula in inhibiting tumour growth.

Through the co-operation of members of the Department of Surgery, Dr. C. Klausner has obtained specimens from one hundred cancer cases directly from the operating room, and, following techniques developed elsewhere, has sought to grow this tissue in irradiated cortisone-treated rats and in chick embryos. Although some growth has been obtained in several instances in rats, no tumour has yet been obtained which lends itself to successful serial transfer in either rats or chick embryos.

Dr. C. G. Smith worked up a technique for the staining of slices of whole brain using nigrosin, and the subsequent mounting of these specimens using plastic snow. Dr. Smith studied the mechanism of extension of the spinal cord, and noted that the nerve fibres are as long as the cord when it is maximally stretched and that they adapt themselves to a shortened state of the cord by assuming a zig-zag course. The nerve fibres of the cord thus behave like those of peripheral nerves as described by Duncan.

### Publications

Armstrong, M. I. "Cultivation of Tumor Tissue in Developing Chick Embryos"; in *Canadian Cancer Conference*, ed. R. W. Begg, vol. 1, pp. 55–65. New York: Academic Press. 1955.

Basmajian, J. V. "The Marginal Anastomoses of the Arteries to the Large Intestine". (*Surgery, Gynecology & Obstetrics*, vol. 99, Nov., 1954, pp. 614–16).

Basmajian, J. V. and Spring, W. B. "Electromyography of the Male (voluntary) Sphincter Urethrae" (abstract) (*Anatomical Record*, vol. 121, Feb., 1955, p. 388).

Basmajian, J. V. and Szatmari, A. "Effect of Largactil (Chlorpromazine) on Human Spasticity and Electromyogram" (*Archives of Neurology and Psychiatry*, vol. 73, Feb., 1955, pp. 224–31).

Cates, H. A. and Basmajian, J. V. *Primary Anatomy*. Baltimore: Williams & Wilkins. 1955. Pp. 339.

Ham, A. W. and Harris, W. R. "The Repair and Transplantation of Bone"; in *The Physiology and Biochemistry of Bone*, ed. Geoffrey Bourne, New York: Academic Press. 1955.

Howatson, A. F., and Ham, A. W. "Electron Microscope Study of Sections of Two Rat Liver Tumors" (*Cancer Research*, vol. 15, 1955, pp. 62–9).

Smith, C. G. "Changes in the Length and Position of the Segments of the Spinal Cord with Changes in Posture in the Monkey" (*Anatomical Record*, vol. 121, 1955, p. 416).

## *Art as Applied to Medicine*

*Under the direction of Miss M. T. Wishart*

The students numbered 7 this year. This is the first time since the teaching course began in 1946 that they have been accommodated within the Department. The convenience and saving of time this affords to the staff of the Department is immeasurable. The students also gain greatly by this proximity. Their work can be more closely followed and supervised; this advantage, together with easier access to teaching material, to libraries, autopsy and operating rooms, and the contact with departmental problems, has contributed to a marked improvement in the calibre of their work.

The dropping of Special Pathology from the course has proved wise; the time gained has been well spent at the drawing board.

It is of interest to note that medical art departments have been opened at the Montreal General Hospital and the University of Manitoba, and that both are headed by former students of this course.

The average of work has been well maintained; it has covered a wide variety of subjects and techniques. Some of the meetings and publications for which these illustrations have been prepared are; *Ontario Medical Review, Canadian Medical Association Journal, British Journal of Surgery, American Journal of Ophthalmology, Journal of Clinical Investigation, Circulation, Journal of Bone and Joint Surgery, Transactions of the Canadian Ophthalmological Society, Archives of Surgery, American Journal of Physiology, Journal of Scientific Instruments*; Cushing Society at Quebec City, Canadian Ophthalmological Society at Bigwin Inn, British Medical Association Meeting, 16th Congress of the International Society of Surgery at Copenhagen, Detroit Academy of Medicine.

Miss Elizabeth Blackstock completed a series of surgical drawings to illustrate the Hunterian Oration to be delivered by Dr. F. G. Kergin in July 1955 on "Thoracoplasty of Chronic Empyema" before the Royal College of Surgeons, London. Miss Blackstock also carried out some interesting studies on methods of portraying the work of Dr. A. M. Rappaport, Banting and Best Department of Medical Research, on "The Human Liver Acinus, Its Role in the Histogenesis of Hepatic Lesions," to be published in "The Liver and Its Diseases," and also the work of Dr. J. S. Speakman, Department of Ophthalmology, on "Studies in Immunity to Vaccinia

Keratitis in Rabbits," to be presented at the meeting of the Association of Research in Ophthalmology.

Miss Maria Wishart presented a paper on the education of the medical illustrator entitled "This is Your Problem Too" to the panel on "Points of View in Medical Art," Association of Medical Illustrators, Vanderbilt University, Nashville.

## *Bacteriology*

*Under the direction of Professor Philip Greey*

Certain changes in the teaching time-table for Bacteriology have been approved for the next academic year. For some years, twenty-four lectures have been given in the first term and eight in the second term. It is felt that the presentation and assimilation of the subject will be improved by distributing these lectures more equitably between the two terms. Consequently it has been arranged to give sixteen lectures in both the first and the second terms and to have eight additional lectures in the third term of the second medical year. The latter lectures will be devoted mainly to a discussion of virus infections and will be correlated with changes in the curriculum for Hygiene and Preventive Medicine. The total time devoted to laboratory work will be reduced somewhat by these changes but it is felt that this will not detract from that aspect of the teaching.

A new course in special bacteriology was given to graduate students preparing to write the certification examinations in pathology. Drs. Roy, Hawks, and Marion Ross with Dr. Elkerton of the Provincial Department of Health each devoted a week to the special instruction. The course was very well received.

The new laboratory and animal space in the Best Institute referred to in last year's report has been utilized extensively throughout the past year, mainly in the study of ocular diseases of virus aetiology under the direction of Dr. H. L. Ormsby. In the Banting Institute laboratory space was again provided for serological tests used in relation to patients with acquired haemolytic anaemia, under the supervision of Dr. G. D. Hart, Department of Therapeutics.

Through a Public Health Grant, funds were provided to obtain most of the special equipment needed for tissue culture studies and for research on virus infections.

### Research

Members of the staff have undertaken the following research work:

Dr. R. M. Price has continued her interest in prophylactic vaccination against tuberculosis, with particular reference to methods and resultant allergy.

Dr. C. E. van Rooyen, with Miss Nancy Sparling, is endeavouring to isolate and identify the causative agent of infectious hepatitis using tissue cultures of monkey spleen and human embryonic tissue. Dr. van Rooyen has made an extensive field survey of infectious hepatitis in the rural communities and cities of Ontario. The highest incidence of cases has been recorded in those areas where the sanitary standards have been low. Another feature of the disease in Ontario has been the high incidence of family cases among children. The disease appears to flourish in the colder months of the year, particularly in the late fall and early spring. Dr. J. C. Sinclair of the Department of Medicine, who is associated with the study, has investigated and supplied materials from cases of chronic hepatitis encountered on the wards of the Toronto General and Sunnybrook Hospitals.

Dr. G. H. Hawks, at St. Michael's Hospital, has completed a study of sporotrichosis and is investigating antistreptolysin titres in selected patients.

Dr. T. E. Roy, at the Hospital for Sick Children, has continued a study of the sensitivity to antibiotics of the various aetiological agents encountered in childhood infections. He has completed a study of two fatal cases of septicaemia in the newborn due to Listeria monocytogenes.

Dr. Marion Ross, at Sunnybrook, is studying the antistreptolysin titres in patients with chronic rheumatic heart disease.

Dr. Greey and Miss Joan Hennessy have studied a case of meningitis, with recovery, in an adult, due to Listeria monocytogenes. They have also encountered two cases of sporotrichosis and a case of tularaemia. Recently a case of paratyphoid fever due to Salmonella paratyphosus A was investigated. It is most unusual for this micro-organism to be isolated in Ontario. In co-operation with Dr. W. B. Spaulding, Department of Medicine, a study of cat scratch disease is being made. An antigen suitable for skin testing has been prepared. Within the past six months some twenty cases of the disease have been detected, a few having previously been diagnosed as tuberculous adenitis. Miss Hennessy is endeavouring to isolate the virus by tissue culture techniques.

### Publications

Collins, Anne M., Craig, Grace, Zaiman, Elisabeth, and Roy, T. E. "A Comparison between Disk-Plate and Tube-Dilution Methods for Antibiotic Sensitivity Testing of Bacteria" (*Canadian Journal of Public Health*, vol. 45, no. 10, Oct., 1954, pp. 430–9).

Greey, P. H., Hennessy, Joan, and Hogarth, Jean. "Blood Concentrations and Clinical Results following the Oral Administration of Penicillin" (*Canadian Medical Association Journal*, vol. 72, no. 4, Oct., 1954, pp. 335–8).

Hawks, G. H. "Sporotrichosis: Report of Three Cases from Toronto" (*Canadian Medical Association Journal*, vol. 72, no. 1, Jan., 1955, pp. 28–32).

Roy, T. E., Boyd, Gladys, *et al.* "The Middlebrook-Dubos Hemagglutination Test for Tuberculosis in Children and Adults" (*Journal of Clinical Investigation*, vol. 33, no. 11, Nov., 1954, pp. 1415–22).

Roy, T. E., Hamilton, J. D., and Greenberg, Louis. "Wound Contamination and Wound Infection" (*Journal of the Royal Army Medical Corps*, vol. 100, 1954, pp. 276–95).

## *Biochemistry*

*Under the direction of Professor A. M. Wynne*

The total number of students registered in the Department in 1954–5 was somewhat smaller than in the previous session. The distribution of the students was as follows:

| | *1953–1954* | *1954–1955* |
|---|---|---|
| Faculty of Medicine: first medical year | 145 | 124 |
| Faculty of Arts: third and fourth years | 62 | 43 |
| Faculty of Dentistry: first dental year | 81 | 89 |
| Faculty of Household Science: third and fourth years | 5 | 14 |
| School of Graduate Studies | 55 | 56 |
| Total | 348 | 326 |

Of the 56 graduate students, 29 came from other departments to study some phase of biochemistry as a minor subject. The other 27 students were divided as follows: 14 were registered for the Ph.D. degree in Biochemistry, 6 for the M.A., and 1 for the M.Sc. Dent. degree, while 6 others were engaged in studies preparatory to registration for a higher degree in Biochemistry.

The only changes in the staff of the Department during the past year were minor ones affecting the laboratory instructors. For the first time in several years it has been possible to appoint seven Fellows in Biochemistry. One of these has served as assistant to Professor Butler in the advanced laboratory for fourth-year P. and B. students and graduate students. Each of the other six Fellows has been responsible for the laboratory instruction of a group of medical students. Five other graduate students have assisted in the laboratory instruction of the dental students and the

third-year honour Arts students. Though the demands on the time of these five instructors were very moderate, in conformity with the conditions of the scholarships and other grants by which they were supported, the experience gained was a valuable part of their training in biochemistry. The distribution of the laboratory teaching over a larger group of instructors has, we believe, increased the effectiveness of the instruction.

Dr. A. C. Chibnall of the University of Cambridge visited the Department in November under the auspices of the School of Graduate Studies. He spoke to a large audience on the structure of the insulin molecule, a field of investigation in which he has made notable contributions.

Dr. J. Manery Fisher organized the symposium on the significance and regulation of ion distribution in animal tissues and fluids held in October 1954 in connection with the annual meeting of the Canadian Physiological Society. She presented the introductory paper at the symposium and she served as editor of the several papers preparatory to their publication.

Dr. Hanes was invited to take part in two symposia during the session: one on glutathione at Ridgefield, Connecticut, the other on amino acids at Los Angeles. He contributed a paper at each symposium.

Dr. Butler took part, by invitation, in a symposium on nucleic acids and proteins at the Gordon Conference in New Hampton, New Hampshire.

It is a pleasure to refer in this report to the award of the Flavelle Medal of the Royal Society of Canada to Professor Charles Hanes of this Department. This award was made in recognition of Dr. Hanes' outstanding contributions in the field of enzyme research.

The programme of research which is described below was made possible through generous financial assistance received from the University's Advisory Committee on Research, the Banting Research Foundation, the J. P. Bickell Foundation, the Foster Bequest, the Insulin Fund, the National Cancer Institute of Canada, the National Research Council, and the Research Council of Ontario.

## Research

### *Under the direction of Professor G. C. Butler*

Miss Z. Broniscer has completed her study of nucleic acid metabolism in *Escherichia coli.* She has discovered two previously unrecognized constituents of enzymic hydrolysates of the desoxyribonucleate isolated from this organism. Mr. C. W. Helleiner concluded a study of the action of enzymes on polynucleotides. Mr. G. H. Kinsman has tested procedures for the chemical and enzymic synthesis of uridine diphosphate derivatives. Mr. D. H. Murray has continued his work on the chemical synthesis of $C^{14}$-labelled pentoses. Dr. J. H. Nixon has developed a method for the isolation, in good yield, of pure preparations of nuclei from liver. Mr. L. B. Smillie has studied in some detail the proteins isolated from the nuclei of avian erythrocytes and he has investigated the incorporation of labelled amino acids into the histones of nuclear nucleoproteins. Mr. I. G. Walker concluded a study of the chemical nature of the desoxyribose derivatives obtained by the enzymic hydrolysis of desoxyribonucleate. Dr. Butler has continued to collaborate with Professor R. C. Parker as research adviser to Mr. G. M. Healy who is a candidate for the Ph.D. degree in Biochemistry.

### *Under the direction of Professor B. F. Crocker*

Dr. Crocker and his graduate students have investigated various aspects of the mechanism of the biosynthesis of enzymes in *Escherichia coli.* Mr. R. Holmes has continued a study of the rapid formation of an enzyme in the absence of an external inductor, and he has demonstrated the induced formation of an enzyme by a "cell-free" preparation. He has also investigated the nature of the transport mechanism involved in the entry of galactosides into the *E. coli* cell. Mrs. R. Sheinin has

investigated the induction of two distinct enzymes, using a single externally applied inductor. The apparent constancy observed in the ratio of the rates of formation and amounts of the two enzymes induced under these conditions has indicated the possibility that there is formed, from various external inductors, one common internal inductor. This may represent a beginning in the identification of the inductor actually involved in the biosynthesis. Miss D. M. L. Michener has determined the optimum conditions for the induction of $\beta$-galactosidase with each of several inductors, in order to be able to decide whether the same mechanism is involved in all cases. She has also extended Mrs. Sheinin's observations regarding the nature of the internal inducing substance. Miss Joyce Taylor has studied the induction of enzyme-formation in cell-free systems.

*Under the direction of Professor J. Manery Fisher*

One of the major interests of Dr. Fisher and her graduate students during the past year has been problems of the active transport of inorganic ions in relation to metabolic processes in biological materials. In the study of these problems three general types of material have been employed, namely, intact tissue such as frog muscle, tissue slices (brain) and cellular particulates (muscle mitochondria).

Miss K. E. Toye has concluded a study of the influence of substances such as iodoacetate and 2,4 dinitrophenol on the insulin-stimulated oxygen-consumption and potassium-uptake of frog muscle. She has also investigated the influence of fluoride on the insulin effect, both in the presence and in the absence of added calcium ions; and she has demonstrated the occurrence of "insulin-binding" in frog muscle.

Mr. H. Husdan has developed methods of cutting and handling thin slices of the cerebral cortex of the Rhesus monkey and he has investigated the active transport of potassium and the consumption of oxygen by these slices when they were suspended in suitable media. Miss E. A. Robertson has isolated mitochondria in good yield from pigeon breast muscle and she has undertaken an investigation of the electrolyte content of the mitochondria under different conditions.

Dr. Fisher has compared two cation exchange resins (a sulphonic acid resin and a carboxyl resin) with respect to their affinities for $H^+$, $Na^+$, and $K^+$ ions: a study of the affinities of two different non-diffusible electrolytes for diffusible electrolytes. These resins might be regarded as simple counterparts of non-diffusible electrolytes of a more complex nature which are present in cell membranes or in the interior of living cells and which may in some manner as yet obscure be concerned with the preferential selection of certain diffusible ions.

*Under the direction of Professor C. S. Hanes*

Dr. C. S. Hanes and his associates have continued their studies on enzymic reactions leading to the synthesis and interconversion of peptides, which may be related to the process of protein synthesis. One graduate student, Mr. G. H. Dixon, concluded a study of a glycyl group-transferring enzyme, and another, Mr. G. E. Connell, has continued a detailed study of a glutamyl transferring enzyme. In these two enzyme systems new problems in enzyme kinetics have been encountered, the solution of which has been of general interest. Mr. A. T. Matheson has been investigating a curious enzyme (cysteinyl-glycinase) which its discoverer (F. Binkley) has claimed to consist of a nucleotide and not a protein; this claim cannot as yet be confirmed but the enzyme is found to have many exceptional properties. Mr. C. K. Harris who has joined the group this year has begun a study of the intracellular distribution of various peptidase and transpeptidase enzymes, while Miss E. H. Wade has continued her study of some of the biochemical factors which may be involved in the microscopic structure of starch grains.

*Under the direction of Professor A. M. Wynne*

Dr. C. G. Stewart concluded a study of the relative thermodynamic efficiencies of energy-realization associated with electron transport in oxidative processes in normal and malignant tissue. Mr. T. B. Bojarski has continued the study of the

diphosphopyridine nucleotidase activity of the intracellular fractions of normal and malignant tissues. He has also studied in some detail the distribution of the total phosphorus and total nitrogen in the "microsome" fractions obtained from rat liver and spleen and from Novikoff hepatoma.

Graduate students have completed the following theses:

*For the M.A. degree:*

Broniscer, Miss Zuleika. Nucleic acid metabolism in *Escherichia coli.*
Odense, Paul H. A study of fat digestion in the dog.

*For the Ph.D. degree:*

Helleiner, Christopher W. Studies on the structure of desoxyribonucleate.
Walker, Ian G. The isolation and properties of desoxyribose nucleotides and nucleosides.

### Publications

Connell, G. E., Dixon, G. H., and Hanes, C. S. "Quantitative Methods for the Study of Enzymic Transpeptidation Reactions" (*Canadian Journal of Biochemistry and Physiology*, vol. 33, 1955, pp. 416–27).

Hanes, C. S. "Enzymatic Reactions leading to the Formation of Peptides"; in *Canadian Cancer Conference*, vol. 1, ed. R. W. Begg, pp. 168–72. New York: Academic Press. 1955.

Hanes, C. S., Dixon, G. H., and Connell, G. E. "Glutathione in relation to Transpeptidation Reactions"; in *Glutathione*, symposium ed. S. Colowick and others, pp. 145–50. New York: Academic Press. 1954.

Helleiner, C. W. and Butler, G. C. "The Hydrolysis of Phosphate Diesters with Barium Hydroxide" (*Canadian Journal of Chemistry*, vol. 33, 1955, pp. 705–10).

Manery, J. F. "General Principles and Problems of Electrolyte Research"; contribution to Symposium on the Significance and Regulation of Ion Distribution in Animal Tissues and Fluids (*Canadian Journal of Biochemistry and Physiology*, vol. 33, 1955, pp. 453–61).

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## *Hygiene and Preventive Medicine*

*Under the direction of Professor M. H. Brown*

The Department suffered a severe loss in the death of Professor Donald T. Fraser on July 20, 1954, in Santiago, Chile. Dr. Fraser was making a tour of South American medical schools and schools of public health at the request of the World Health Organization when he was stricken by a heart attack from which he died ten days later. Dr. Fraser was appointed to the Department in 1920 and was made Head in 1940.

The course of instruction was continued as in the previous session with some alterations. The first-year students received orientation lectures from the Head of the Department, a general practitioner, a paediatrician, an obstetrician, and a surgeon in order to illustrate that preventive medicine has a place in all fields of the practice of medicine.

The joint undertaking of the Departments of Medicine and Hygiene and Preventive Medicine for the instruction in the social and economic aspects of medicine was continued but in a modified form. In place of selecting 15 third-year students,

two clinic groups of this year were required to take a social history on all cases assigned to them while on the medical wards. A group of fourth-year students were assigned cases in the medical out-patient department of the Toronto General Hospital and observed the patients and families in the environment of the home. Four of these cases were presented to the second and third medical years by members of the fourth medical year. In this way a much larger group of students had the benefit of this form of instruction than was the case in previous years. This joint undertaking was supported by a further grant from the Rockefeller Foundation to the University for a three-year period, and grateful acknowledgment is made at this time.

A committee consisting of the professors of Medicine, Obstetrics, Paediatrics, Bacteriology, and Preventive Medicine, with the Dean as chairman, reviewed the curriculum in Hygiene and Preventive Medicine. The committee recommended that no lectures be given in the first medical year, that the course in the second and third years be revised with the presentation of communicable diseases at an earlier date, and that the instruction in the fourth year be given on three afternoons of each week instead of four as heretofore. These recommendations were approved by Council.

The total enrolment of students receiving instruction in the Department was 1,025, as follows: 11 candidates for the diploma in Public Health, 2 for the diploma in Dental Public Health, 3 for the diploma in Veterinary Public Health, 3 for the degree of Master of Applied Science, 3 for the certificate in Public Health, 2 for the degree of Doctor of Philosophy registered in this Department, 2 for the degree of Master of Arts registered in this Department, 2 graduate students not proceeding to a degree, 2 graduate students registered in other departments, and 5 candidates for the degree of Master of Science in Agriculture; 152 fourth-year medical students, 152 third-year medical students, 146 second-year medical students, 131 first-year medical students, 36 in the Household Economics course, 9 in the Physiology and Biochemistry course, 6 in the Food Chemistry course, 12 in the Faculty of Household Science, 36 in the School of Physical and Health Education, 189 in the School of Nursing, 113 in the Faculty of Pharmacy, and 8 in the Dental Hygiene course.

## Research

Members of the staff have undertaken the following research work:

Dr. Milton H. Brown and Dr. George Moss completed the work on the efficacy of tetanus toxoid in ex-service personnel. They found that 97 out of 100 personnel who had not received any toxoid for from six to fifteen years had sufficient antitoxin to protect them. Within one week following a booster dose all responded well and 67 had more than ten units of antitoxin per cc. of blood.

Dr. Brown and Dr. H. Plummer completed the work on "A" substance in TAB and cholera vaccines and it is now proposed to carry out investigations as to the production of "A" antibodies following the use of these vaccines in humans. The "A" substance found in vaccines and toxoids is immunologically similar to the "A" substance in human red blood cells.

Dr. F. H. Fraser has continued the investigation of methods for the electrophoresis of viruses on paper, including continuous electrophoresis.

Dr. F. O. Wishart has completed a preliminary trial of tetanus toxoid administered intranasally as a booster dose. A marked antitoxin response was demonstrated in the great majority of individuals.

Dr. R. J. Wilson has continued his studies on the growth requirements of *H. pertussis* grown on a chemically defined medium developed in the Department. In conjunction with Dr. M. Goldner, attempts are being made to define more accurately the nutritional requirements of this micro-organism using paper chromatography and other related biochemical techniques.

As part of a project on chemotherapy of tuberculosis, Dr. C. O. Siebenmann continued his investigation of the biological properties of drug-resistant strains of

*M. tuberculosis.* He found further evidence of a close relationship between the development of isoniazid resistance and the loss by the tubercle bacillus of its pathogenicity for the guinea-pig.

Dr. E. Kovacs continued his systematic studies of nucleolytic enzymes in the cerebrospinal fluids of various pathological conditions, especially poliomyelitis.

Mr. M. D. Poulik continued work on purification of diphtheria and tetanus toxin and toxoid with the aid of simple and continuous filter paper electrophoresis as well as starch and agar gels. In collaboration with Mr. L. Pinteric an electronic computer for evaluation of the results of filter paper electrophoresis, especially of human serum, was completed. The work on high voltage electrophoresis, as well as on evaluation of proteins with the aid of ultraviolet light and isotopes, has started.

Mr. G. J. Pawlowski has continued an investigation of the host-phage systems of the genus Mycobacterium.

Graduate students have completed the following theses:

*For the M.A. degree:*

HOWARD, Miss N. M. The immunological response following BCG infection.

### PUBLICATIONS

BROWN, M. H. and HEATON, T. G. "Intradermal Histoplasmin Reactors at the University of Toronto" (*Canadian Medical Association Journal*, vol. 72, Apr. 1, 1955, p. 531).

PLUMMER, H. C. and BROWN, M. H. "The Effect of ACTH on BCG Infection in the Guinea-pig" (*Canadian Journal of Public Health*, vol. 46, Jan., 1955, p. 45).

——— "A Study of Acid-fast Bacilli recovered from Tuberculous Monkeys" (*Canadian Journal of Public Health*, vol. 45, July, 1954, pp. 296–300).

WILSON, R. J. "Cultivation of *H. pertussis* (Phase 1) in Chemically Defined Medium" (*Canadian Journal of Public Health*, vol. 46, Jan., 1955, p. 44).

——— "It Pays to Immunize!" (*Health*, July-Aug., 1954, pp. 18–19).

WISHART, F. O. and MACQUARRIE, M. J. "Intranasal Tetanus Toxoid as a Recall Dose" (*Canadian Journal of Public Health*, vol. 46, Jan., 1955, p. 48).

## *Medicine*

*Under the direction of Professor R. F. Farquharson*

The Department suffered a serious loss in the death of Dr. Harold E. Rykert. He was an excellent teacher, an industrious and successful research worker, and a first-class physician. We are grateful for his many years of competent teaching, for his boundless energy and enthusiasm, for his ability to support and develop young physicians, and for all the other qualities which contributed to his great service to our University. He is greatly missed.

The resignation of Miss Marion I. Hanna after many years of competent, faithful service as research assistant and senior chemical technician is recorded with regret. Her accurate work was wonderfully valuable and we are grateful for her excellent help over a long period.

An attempt has been made to improve the medical teaching of the final year by dividing the students into smaller groups of two or three. Each group works in close association with a team comprised of two or three members of the medical staff, a senior and a junior interne. The students receive instruction on the wards and act as assistants to the internes.

In the past two years clinical pharmacological conferences have been held in a two-hour period once a week with each division of the third medical year taking medical clinics at the Toronto General Hospital. The therapeutic problems of one or two patients are discussed in practical detail, first by the students and then by Professor Ferguson and members of the medical staff.

The Department has always been aware of the importance of instructing medical students in the understanding of patients' emotional difficulties, which are part of all illnesses. Various methods have been tried to improve teaching in this regard, always with the realization that only with longer experience in medicine and living can the student begin to understand these problems. During the past year Dr. Allan Walters has been giving more formal instruction and drill to small groups of third- and fourth-year students on clinical methods of psychological examination and evaluation of the nature of the person, based on the students' own work on assigned patients.

The Department welcomes the return and appointment of Dr. John K. Wilson to St. Michael's Hospital, Dr. John Crawford to take charge of physical medicine at the Toronto Western Hospital, Dr. John C. Laidlaw to succeed Dr. W. R. Campbell in charge of the metabolism laboratory in the Banting Institute, and Dr. Calvin Ezrin to continue full-time clinical-pathological investigation of pituitary disorders.

## Research

### Arthritis and Collagen Diseases

Dr. Wallace Graham and Dr. Philip Rosen have made an extensive study of the cases of the shoulder-hand syndrome at Sunnybrook Hospital and the Toronto General Hospital. Dr. Metro Ogryzlo, with Dr. Wallace Graham and his other associates, has continued his long-term study of the effects of ACTH and cortisone therapy in various collagen diseases. He has also made a detailed investigation of the lupus erythematosus (L.E.) cell reaction in many reactive diseases and has made time-lapse microcinematographs to illustrate the formation of these cells *in vitro*. The serum proteins in rheumatoid arthritis have been studied by Dr. Ogryzlo in collaboration with Dr. A. A. Fletcher and Professor J. A. Dauphinee by means of electrophoretic and chemical analyses.

### Cardiovascular Research

Dr. Ramsay Gunton has continued his active full-time investigation of various cardiovascular problems. With the help of Dr. W. Paul (Department of Pathological Chemistry) he has studied the mechanism of shock following myocardial infarction by determinations of cardiac output, blood volume, circulation time and ordinary clinical measurements, and has been investigating various methods for the relief of this type of shock. Working in conjunction with Dr. Gunton and Dr. Paul, Dr. C. R. Woolf (Frances Esther Hutchison Fellow) has been studying pulmonary and cardiovascular function in patients with pulmonary fibrosis, pulmonary emphysema and kyphoscoliosis both with and without frank right heart failure. They have also become proficient in the technique for measuring total red blood cell volume using radioactive sodium chromate. This method has also been used to measure the red cell survival time in haemolytic anaemias and other conditions. With Drs. E. H. Botterell, W. M. Lougheed and J. W. Scott, Dr. Gunton has analysed electrocardiographic changes occurring in thirty-one patients whose body temperature was reduced to 28–30° C. during neurosurgical procedures in treatment of vascular lesions. In all three hospitals investigations are continuing of electrolyte changes in congestive heart failure and during treatment for it. Dr. W. B. Spaulding has completed a study of the prognosis of patients with intermittent claudication which he undertook at King's College Hospital, London, in 1953–4. In collaboration with Dr. K. W. G. Brown, he has continued the detailed study of patients with peripheral vascular disorders at the Toronto General and Sunnybrook Hospitals. They are making use of special Defence Research Board facilities at Downsview to evaluate the response of these patients to graded exercises before and after various therapeutic measures. Drs. W. F. Greenwood and A. D. McKelvey have continued to work closely with Dr. Bigelow in the preoperative investigation and postoperative follow-up of patients with mitral valve disease. The first report of the "Co-operative rheumatic fever

study" dealing with the effect of cortisone, ACTH and acetylsalicylic acid, in which Dr. McKelvey represented the Toronto General Hospital, was published in *Circulation* in March, 1955. Dr. D. P. Murnaghan has been studying the "chair" treatment of patients suffering from recent cardiac infarction. The interest in the use of drugs which lower the blood pressure has been continued by Dr. C. R. Burton and his associates, with Dr. John Morrow as the central figure. Dr. Burton has begun a second follow-up of the series of cases of coronary thrombosis previously reported on evaluation of the effect of anticoagulant therapy.

### Chest Diseases

Dr. H. E. Pugsley and Mr. R. Delamere (inventive engineer) have continued work on the development of the new type of respirator described in last year's report. When it was tried on two convalescent poliomyelitis patients with vital capacities of 50 and 150 cc. respectively, the tidal air rose to approximately 500 cc. and the patients noted some advantages over the conventional type of respirator which forces them to breathe at a fixed rate and rhythm. Certain mechanical defects were found, however, and a new model is now being prepared which is expected to function more satisfactorily. Continuing his study described last year, Dr. W. A. Rowland for a time found it difficult to obtain a suitable plastic for the injection of the inflated lungs of patients who had suffered chronic pulmonary disease. A plastic prepared by the Ciba Company appears to be satisfactory, however, and Dr. Rowland and Dr. Murnaghan now hope to progress in this aspect of their study of the relationship of chronic pulmonary disease to cor pulmonale and polycythaemia. They have raised the question whether pulmonary emphysema may sometimes develop because of primary vascular disease as well as following recurring attacks of bronchitis and asthma. They are studying patients at Sunnybrook Hospital and at the Wellesley Division of the Toronto General Hospital.

### Dermatology

Dr. N. M. Wrong and his associates have been studying the value of rauwolfia and its extracts in a number of chronic dermatoses. With Dr. J. C. Laidlaw's help they have studied the constitutional effects of application of large doses of fluorohydrocortisone to the skin of two patients. Dr. Stewart Rogers has been interested in the association between incontinentia pigmenti and congenital defects such as cataracts and retrolental fibroplasia.

### Gastroenterology

Drs. E. J. Maltby, R. C. Dickson and P. M. O'Sullivan have nearly completed their initial study of the effect of treatment with ACTH and cortisone on the course of ulcerative colitis and Crohn's disease. Dr. Dickson has been continuing his observations on the effect of gluten-free diets in patients with sprue and other chronic abdominal disorders of ill-defined nature. He is also studying the symptoms that may appear after partial gastrectomy. Dr. J. C. Sinclair continues to collaborate with Dr. van Rooyen of the School of Hygiene in the study of virus hepatitis. They have studied outbreaks of the disease in various parts of the Province and have obtained specimens from the patients for trial of growth of the virus in tissue culture. Dr. Sinclair continues his study of chronic liver disease with Professor Dauphinee.

### Metabolism and Endocrinology

Dr. Calvin Ezrin with Dr. F. M. Hill (Department of Pathology) and Dr. W. J. Horsey (Department of Surgery), aided by Dr. J. W. Scott, have perfected a technique of producing hypothalamic lesions in the cat and the monkey. They have begun the study of the effect of these lesions on the cytology and function of the pituitary gland. Dr. Ezrin and Dr. Hill have also been pursuing clinical studies of acromegaly and other pituitary disorders. Drs. M. A. Ogryzlo, J. M. Vale and M. W. Johnston have completed an initial investigation of the value of administration of

exogenous thyroid-stimulating hormone in the differentiation of primary myxoedema from pituitary hypothyroidism. Drs. Johnston and Vale have continued their studies on the effect of various environmental and endocrine factors on thyroid function. Drs. A. H. Squires, M. W. Johnston and J. M. Vale continue to study the tolerance of euthryoid and myoedematous patients to increasing dosage of thyroid. Dr. R. C. Dickson and Dr. G. W. Smith have used potassium perchlorate as an anti-thyroid drug in six patients with hyperthyroidism and have found it effective. Drs. J. G. Watt and J. Sturtridge, with Dr. C. P. MacLean (Pathologist at the Toronto Western Hospital), have studied a group of five cases of parathyroid tumour. In one of them the state of hyperparathyroidism recurred after a period of many months, relief following removal of the tumour; the recurrence was due to functional hyperparathyroidism of metastases of the original tumour. Dr. J. C. Laidlaw has set up a laboratory for the study of adrenocortical function in health and disease. He has observed the response to the intravenous administration of ACTH of forty adult patients with no evidence of endocrine disease. When ten patients with severe anterior pituitary insufficiency were given this standardized intravenous ACTH test they were found to have a much smaller response in the urinary excretion of 17-ketosteroids and 17-hydroxycorticoids than the controls. Patients with primary Addison's disease, on the other hand, show no response at all. This intravenous ACTH test will be valuable in the diagnosis of adrenal insufficiency secondary to pituitary disease in which there may be few or no specific clinical signs of the adrenal disorder. Dr. W. T. W. Clarke continues the study of pregnancy in diabetic women, in collaboration with the Department of Obstetrics and Gynaecology and the Connaught Medical Research Laboratories. They are making observations on the excretion of chorionic gonadotrophin and correlating the findings with the clinical course and fetal mortality. Dr. G. W. Smith continues his study of renal function in diabetics in the out-patient clinic and of renal lesions in any diabetics coming to post-mortem examination.

### Neurology

Dr. H. H. Hyland and Dr. D. Levy completed a clinical-pathological review of verified cases of spontaneous cerebellar haemorrhage. Dr. Hyland and Dr. Barnett are pursuing a study of subdural haemorrhage caused by rupture of intracranial aneurysms. Dr. J. C. Richardson and Dr. S. P. Starkman have been reviewing the cases of motorneuron disease. In collaboration with Dr. J. W. Scott and Dr. W. Kalow (Department of Pharmacology) electromyographic tracings and determinations of blood pseudocholinesterase have been made in patients showing marked muscle fasciculation. Dr. H. J. M. Barnett and Dr. N. Fremes (D.V.A. Fellow, Sunnybrook Hospital) have been making a study of the natural history of myasthenia gravis in patients treated at the Toronto Western Hospital, the Toronto General Hospital and Sunnybrook Hospital. Dr. J. W. Scott and Dr. J. S. Prichard of the Hospital for Sick Children have reviewed the electroencephalograms showing a spike and wave pattern found in the files of the Toronto General Hospital and the Hospital for Sick Children and have studied their clinical correlation. Dr. James P. Grant has made a critical review of the use of chlorpromazine (Largactil) in the Psychological Medicine Unit at the Wellesley Division of the Toronto General Hospital.

### Haematology

Haematological investigations and other studies undertaken by Dr. K. J. R. Wightman and his associates are described in the report of the Department of Therapeutics. Dr. R. L. MacMillan continues to study the use of anticoagulants. He has been trying to make a therapeutic extract of the antihaemophilic factor in human brain tissue. Dr. A. H. Squires and Dr. David Stinson (Assistant Resident in Medicine at Sunnybrook Hospital) have been making a critical review of cases of multiple myeloma. Dr. J. G. Watt is making a similar study at the Toronto Western Hospital.

Drs. O. H. Warwick, K. J. R. Wightman and A. H. Squires have continued to study the use of newer chemotherapeutic agents in treatment of leukaemia and allied disorders. Dr. J. R. Bingham continues his investigation of the macrocytic anaemia found in liver disease. Working with Dr. J. G. Watt at the Toronto Western Hospital, Dr. Dorothy Ley (National Research Council Fellow) has been measuring serum iron values in various conditions.

### Miscellaneous

Drs. W. A. Oille and B. McK. Hazlett have been studying a patient who is unable to make appreciable amounts of gamma globulin and, accordingly, is subject to repeated infections. Dr. Oille has also been reviewing the records of a series of cases of Friedländer's bacillus infection. Dr. O. H. Warwick, with Dr. A. J. Phillips of the National Cancer Institute of Canada, has made a study of the incidence of cancer among Canadian Indians. With Dr. R. M. Clark (Department of Pathology), he has reviewed the Toronto General Hospital records of patients with lymphoepithelioma. He is studying the clinical course of some 856 cases of cancer of the breast admitted to the Toronto General Hospital between 1937 and 1949. Dr. W. B. Spaulding has continued his study of angioneurotic oedema, observing the therapeutic effect of testosterone and, experimentally, the ability of histamine and hyaluronidase to produce a spreading oedema like that of the natural disease. Dr. Spaulding has also studied twelve patients with cat scratch disease.

## Publications


Barnett, H. J. M. "Care of the Unconscious Patient" (*University of Toronto Medical Journal*, vol. 32, no. 2, 1955, pp. 58–60).

Bingham, J. R. "Abdominal Pain" (*Canadian Nurse*, vol. 50, no. 7, 1954, pp. 543–8).

Farquharson, R. F. "Care of the Aging Patient" (*Medical Record and Annals*, vol. 48, no. 9, 1954, pp. 53–60).

——— "Disorders of the Pituitary Gland" (*Cincinnati Journal of Medicine*, vol. 36, nos. 2 and 3, 1955, pp. 49–56 and 97–101).

——— "The Menopausal Patient" (*Medical Record and Annals*, vol. 49, 1955, pp. 196–204).

——— "The Present Medical Situation" (*Transactions of the Association of Life Insurance Medical Directors of America*, vol. 38, 1955, pp. 5–22).

FitzGerald, J. D. L., Fischer, J., and Doenne, A. E. M. "Seasonal Incidence of Atmospheric Mold Spores" (*Canadian Medical Association Journal*, vol. 72, 1955, pp. 700–1).

Graham, Wallace. "Fibrositis and Non-Articular Rheumatism" (*Physical Therapy Review*, vol. 35, no. 3, 1955, pp. 128–33).

——— "The Fibrositis Syndrome"; in *Textbook of Medicine* ed. Cecil, R. L. and Loeb, R. F. (ninth edition), pp. 1411–14. Philadelphia: W. B. Saunders & Co. 1955.

Gray, C. C. "Dissecting Aneurysm of the Aorta" (*Bulletin of the Academy of Medicine*, Toronto, vol. 28, no. 5, 1955, pp. 110–13).

Gunton, R. W. "Diamox (Acetozoleamide)"; Editorial (*Canadian Medical Association Journal*, vol. 72, no. 10, 1955, p. 780).

Gunton, R. W. and Paul, W. "Blood Volume in Congestive Heart Failure" (*Journal of Clinical Investigation*, vol. 34, no. 6, 1955, pp. 879–86).

Hair, H. C. "Impetigo and Your Child" (*Health*, no. 6, Nov.-Dec., 1954, p. 6).

Hall, W. E. "Alcoholics in the General Hospital" (*Alcoholism Research*, vol. 2, no. 3, 1955, pp. 5–10).

Hyland, H. H. and Barnett, H. J. M. "Pathogenesis of Cranial Nerve Palsies associated with Intracranial Aneurysms" (*Transactions of the American Neurological Association*, vol. 78, 1953, pp. 127–31). (Published in 1954.)

Hyland, H. H. and Levy, D. "Spontaneous Cerebellar Haemorrhage" (*Canadian Medical Association Journal*, vol. 71, no. 4, 1954, pp. 315–23).

Kerwin, A. J. "Ebstein's Anomaly: Report of Case Diagnosed during Life" (*British Heart Journal*, vol. 17, no. 1, 1955, pp. 109–12).

——— "Value and Limitation of Cardiac Catheterization" (*Ontario Medical Review*, vol. 21, no. 5, 1954, pp. 291–5).

Laidlaw, J. C., Goldfien, A., Haydar, N. A., Renold, A. E., and Thorn, G. W. "Fluorohydrocortisone and Chlorohydrocortisone, Highly Potent Derivatives of Compound F" (*New England Journal of Medicine*, vol. 252, no. 11, 1955, pp. 415–21).

Laidlaw, J. C., Harrison, J. H., Leman, C., and Munson, P. L. "Hormone Excretion before and after Castration and Adrenalectomy" (*New England Journal of Medicine*, vol. 252, no. 11, 1955, pp. 425–8).

Laidlaw, J. C., Jenkins, D., Forsham, P., Reddy, W. J., and Thorn, G. W. "Use of ACTH in the Diagnosis of Adrenal Cortical Insufficiency" (*American Journal of Medicine*, vol. 18, no. 1, 1955, pp. 3–14).

Laidlaw, J. C., Munson, P. L., Goetz, F. C., Harrison, J. H., and Thorn, G. W. "Effect of Adrenocortical Steroids on Androgen Excretion by Adrenalectomized Orchidectomized Men" (*Journal of Clinical Endocrinology and Metabolism*, vol. 14, no. 5, 1954, pp. 495–508).

Laidlaw, J. C. and Nusimovich, B. "Diagnostica y tratamiento de la hiperfunction de la corteza suprarenal" (*La Semana Médica*, vol. 106, no. 1, 1955, pp. 2–7).

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Macdonald, R. I. "Defence Medicine" (*Canadian Services Medical Journal*, vol. 11, no. 2, 1955, pp. 63–5).

——— "Medicine in a Changing World" (*Bulletin of the Academy of Medicine*, Toronto, vol. 28, no. 2, 1954, pp. 34–41).

MacMillan, R. L. and Brown, K. W. G. "Heparin and Thromboplastin" (*Journal of Laboratory and Clinical Medicine*, vol. 44, no. 3, 1954, pp. 378–86).

Murnaghan, D. P. "Heart Disease" (*Health*, Jan.-Feb., 1955, pp. 10–11, 17, 26, 28).

Ogryzlo, M. A. "Present Status of ACTH, Cortisone and Hydrocortisone in the Treatment of Rheumatoid Arthritis" (*Canadian Services Medical Journal*, vol. 11, no. 2, 1955, pp. 66–73).

Ogryzlo, M. A. and Volpé, R. "The Cryoglobulin Inclusion Cell" (*Blood*, vol. 10, no. 5, 1955, pp. 493–6).

Owen, T. "Diseases of the Liver, Gall-bladder, Pancreas and Peritoneum"; in *Textbook of Medicine*, ed. Sir John Conybeare and W. N. Mann, pp. 347–78. Edinburgh and London: E. & S. Livingstone, Ltd. 1954.

——— "Physiological Basis for Headache" (*University of Toronto Medical Journal*, vol. 32, no. 2, 1954, pp. 54–8).

Sinclair, J. C. "Outbreak of Infectious Hepatitis affecting a Rural Community in Ontario" (*Canadian Journal of Public Health*, vol. 45, no. 7, 1954, p. 279).

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Spaulding, W. B., Oille, W. A., and Gornall, A. G. "Mineralocorticoid-like Disturbance associated with Adrenal Metastases from a Bronchogenic Carcinoma" (*Annals of Internal Medicine*, vol. 42, no. 2, 1955, pp. 444–51).

Vale, J. M. "Thyroid Function Tests" (*University of Toronto Medical Journal*, vol. 32, no. 5, 1955, pp. 187–91).

Warwick, O. H. and Phillips, A. J. "Cancer among Canadian Indians" (*British Journal of Cancer*, vol. 8, no. 6, 1954, pp. 223–30).

Wilson, J. K. and Greenwood, W. F. "Natural History of Mitral Stenosis" (*Canadian Medical Association Journal*, vol. 71, no. 4, 1954, pp. 323–31).

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——— "Excoriated Acne of Young Females" (*Archives of Dermatology and Syphilology*, vol. 70, no. 5, 1954, pp. 576–82).

YENDT, E. R., CONNOR, T. B., and HOWARD, J. E. "In Vitro Calcification of Rachitic Rat Cartilage in Normal and Pathological Human Sera with Some Observations on the Pathogenesis of Renal Rickets" (*Bulletin of the Johns Hopkins Hospital*, vol. 96, no. 1, 1955, pp. 1–19).

YENDT, E. R. and HOWARD, J. E. "Studies on the Mode of Action of Citrate Therapy in Rickets" (*Bulletin of the Johns Hopkins Hospital*, vol. 96, no. 3, 1955, pp. 101–15).

## *Obstetrics and Gynaecology*

### *Under the direction of Professor D. E. Cannell*

In the fall of 1954 the University announced the endowment of the Chair of Obstetrics and Gynaecology as the Gordon C. Leitch Chair in Obstetrics and Gynaecology. This was made possible by the generous gift of the late Mr. Gordon C. Leitch whose untimely death in 1954 is greatly regretted. It will enable the Department to establish and maintain a greater number of full-time workers in Obstetrics and Gynaecology. The gratitude of all members of the Department is extended to Mr. Leitch's family for the co-operation which has been given so freely to the University in carrying out the wishes of the donor.

The undergraduate teaching programme has continued satisfactorily. The large size of our classes makes individual teaching somewhat difficult. This, indeed, is one of the major disadvantages of our school for both student and staff. In part, this has been overcome by efforts to break up the clinical group teaching into smaller units. This has the disadvantage of a multiplicity of teachers, with divergent and confused teaching on occasion, from the students' viewpoint. No permanent or easy solution has yet been found. The increasing number of well-trained young men in our Department has improved the quality of our teaching. The financial support given these men by the University is paying dividends and in time will justify the expenditures presently being made.

Certain changes in the use of visual teaching aids in the Department are contemplated and will be introduced in 1956. It is hoped that the cost of these changes will be warranted by improved teaching.

Dr. W. M. Paul has been appointed Dominion Stores' Fellow for 1955–6. He has returned to the Toronto Western Hospital and will act as a clinical teacher in the Department. His experience at the Carnegie Institution of Washington in Baltimore, Maryland, as a McLaughlin Travelling Fellow should provide a basis for continued work in fundamental reproductive physiology in this Department.

Drs. M. L. Bunker and J. O. Swales are presently in Europe on McEachern Memorial Fellowships visiting and working in the foremost centres there and in Great Britain. Dr. Bunker will return as a clinical teacher in the Department attached to the staff of the Toronto Western Hospital commencing January 1, 1956.

At the close of the present academic year, Drs. D. M. Low and W. A. Dafoe sever their connection as active staff members in the Department.

Dr. Low has served in the Department and the Toronto General Hospital for thirty-three years. He has given unstintingly of his time to undergraduate and postgraduate teaching. In addition, his work in the Department has been responsible for bringing honour to it and to himself in the field of clinical investigation. He was responsible, in great part, for the establishment of the blood bank at the Toronto General Hospital and for the widespread service it has rendered Rh negative mothers who required its service.

Dr. Dafoe began his association with the Department as a Fellow in charge of gynaecological pathology. In recent years he has established and been in charge of the obstetrical and gynaecological service at the Wellesley Division. As a result of his interest and activity this has become a most important part of our undergraduate and postgraduate teaching.

The contribution of many years of devoted service exemplified by these men is a constant reminder of the part played in medical education by part-time teachers. Their years of experience bring practical solutions of academic and clinical problems. The Department is grateful for their contributions in the past and wishes them well in the future conduct of their active practices.

The Department was honoured by visits from Professor M. A. van Bouwdijk Bastiaanse, Head of the Department of Obstetrics and Gynaecology, University of Amsterdam, The Netherlands; Professor L. V. Phatak, Head of the Department of Obstetrics and Gynaecology, Gajraja Medical College, Gwalior, India; Dr. Herbert E. Schmitz, Director of Obstetrics and Gynaecology, The Henry Schmitz Medical Foundation, Chicago, Illinois. Dr. Sek Mun Goon, Assistant Lecturer, Department of Obstetrics and Gynaecology, University of Malaya, Singapore, is spending six months in the Departments of Obstetrics and Gynaecology and Pathology observing the programme of the stillbirth and neonatal study.

The Head of the Department wishes to acknowledge his gratitude for the co-operation of his colleagues in the Department, Faculty, and University administration during the past year.

## Research

Members of the staff have undertaken the following research work:

Drs. D. J. Van Wyck and J. D. M. Gillies have continued their studies on Rh sensitization. The results of treatment of sensitized mothers with ACTH and cortisone have been reviewed. These are equivocal and further study will be required and continued into this aspect of the problem.

The investigation being undertaken in regard to the incidence of Rh iso-immunization and the time of its occurrence is proceeding. It is hoped that sufficient data may be accumulated in the forthcoming year to provide a conclusive answer.

Dr. R. A. H. Kinch has completed the first phase of his studies upon fibrogen levels in pregnancy and their significance. The conclusions which have been reached will be presented at the June meeting of the Society of Obstetricians and Gynaecologists of Canada. Other aspects of blood coagulation in pregnancy will be explored with continuation of this study.

Dr. W. H. Allemang and Dr. K. Hodge of the Department of Radiology will present the results of their studies of localization of the placenta at the October meeting of the Royal College of Physicians and Surgeons of Canada at Quebec.

Dr. G. L. Watt has continued his studies of the surgical management of mitral stenosis complicated by pregnancy.

Dr. C. B. Shier's studies on the radio-sensitivity of carcinoma of the cervix continue and certain conclusions are now becoming apparent. His investigation of the significance of carcinoma *in situ* of the cervix has also made some progress.

Drs. J. W. Rogers and R. A. H. Kinch and their co-workers in the Department of Medicine have continued studies on diabetes mellitus complicated by pregnancy.

The combined study in the Departments of Obstetrics and Gynaecology, Paediatrics and Pathology into stillbirths and neonatal deaths has continued. Dr. J. R. Norris has been responsible for the obstetric aspect of this investigation. A display of their findings to date will be presented at the combined meeting of the British Medical, Canadian Medical and Ontario Medical Associations in Toronto this summer. This work will continue and a report of its conclusions and recommendations will be forthcoming in 1956.

Dr. W. M. Paul is attempting to produce a specific precipitin for foetal haemoglobin. It is hoped that this antiserum will be capable of detecting relatively small amounts of foetal haemoglobin should it occur in maternal blood. We hope to study quantitatively the possible passage of foetal red cells into the maternal circulation at the time of placental separation and abruption. A complicating factor is the persistence of minute amounts of foetal haemoglobin in some adults. Any interpretation

of such a study must take this group into account. Progress to date includes the preparation of presumably pure samples of foetal and adult haemoglobin, by a process of controlled alkali denaturation and dialysis. These have been used as the active agents in adjuvant mixtures. Injections of animals are under way. It is hoped that the potency of the antiserum, and therefore, the possibility of the method of investigation, will be established by late summer.

A graduate student, Dr. D. Kumar, has continued his investigation on the relation of aldosterone and the late toxaemia of pregnancy. Preliminary results suggest that some pre-eclamptic patients excrete excessive amounts of aldosterone. Extraction of this substance from the placentae of toxaemic patients has been possible in a small group of patients. The placentae of a similar group of normal patients revealed no evidence of it. His preliminary experimental work has suggested that a pre-eclamptic-like syndrome can be produced in rats by the injection of aldosterone.

Dr. W. A. Dafoe has collaborated with Dr. Murray Barr, Department of Anatomy, University of Western Ontario, in investigating the determination of sex by means of skin biopsy where the external genitalia showed pseudohermaphroditic characteristics. In addition, he has made some new approaches to the surgical treatment of recurrent prolapse in the use of fascia lata and tantalum wire.

### Publications

Armstrong, L. T. "Vomiting during Obstetric Anesthesia" (*Modern Medicine*, vol. 9, no. 12, Dec., 1954, pp. 43–5).

Cannell, D. E. and Bunker, M. L. "Gross Haematuria in Pregnancy" (*Canadian Medical Association Journal*, vol. 72, no. 12, June, 1955, pp. 891–4).

Cannell, D. E. and Horne, L. E. "Fetal Loss in Toronto for One Year" (*American Journal of Obstetrics and Gynecology*, vol. 69, no. 2, Feb., 1955, pp. 289–93).

Goodwin, J. W. and Rogers, J. W. "Carcinoma of the Uterus" (*University of Toronto Medical Journal*, vol. 32, no. 1, Nov., 1954, pp. 15–23).

Low, D. M. "Female Infertility" (*Modern Medicine*, vol. 10, no. 3, Mar., 1955, pp. 53–7).

——— "Rh Factor in Obstetrics" (*University of Toronto Medical Journal*, vol. 32, no. 1, Nov., 1954, pp. 12–15).

Mann, John. "A Retractor for Abdominal Exposure" (*Canadian Medical Association Journal*, vol. 71, no. 11, Nov., 1954, pp. 495–6).

Reynolds, S. R. M., Paul, W. M., and Huggett, A. St. G. "Physiological Study of the Monkey Fetus in Utero" (*Bulletin of the Johns Hopkins Hospital*, vol. 95, no. 5, Nov., 1954, pp. 256–68).

Shier, C. B. and Low, J. A. "Clinical Aspects of Carcinoma-in-situ of Cervix Uteri" (*Bulletin of the Academy of Medicine*, Toronto, vol. 38, no. 4, Jan., 1955, pp. 91–3).

## *Ophthalmology*

*Under the direction of Professor A. J. Elliot*

The Department of Ophthalmology enjoyed a busy session in 1954–5. As in previous years there were 13 postgraduate students in the Department. Dr. Elizabeth Harrison, Dorchester, Ontario; Dr. K. E. Schirmer, Quebec, and Dr. J. S. Speakman, Toronto, were appointed Hermant Fellows in Ophthalmology.

The Department again received federal health grants for study of "Ocular Diseases of Virus Aetiology" and "Keratitis and Endophthalmitis" under the direction of Dr. H. L. Ormsby and of "Prevention of Blindness from Glaucoma" under the direction of Dr. T. H. Hodgson. The tonometer testing station in the glaucoma laboratory continued to serve ophthalmologists, and the eye bacteriology laboratory was of service to the University teaching hospitals and the profession at large. Dr. O. B. Richardson directed the eye pathology laboratory and gratefully acknowledges the large number of eye pathology specimens received from members of the profession.

An international symposium on glaucoma was held at Ste Marguerite, Quebec, in September 1954, under the auspices of the C.I.O.M.S., a division of the United Nations. Dr. Hodgson contributed a paper and occupied the role of secretary, and Dr. Elliot was a member of the symposium. The XVII International Congress of Ophthalmology was held in Montreal and New York in September and members of the Department took part in the programme. Dr. A. J. Elliot was guest speaker at the University of Michigan, Ann Arbor, in April 1955. Dr. R. G. C. Kelly took part in a Montreal conference on medical aspects of traffic accidents in May. Dr. Kelly also gave three lectures to the Armed Forces at the Medical Joint Training Centre on "Management of Eye Injuries." Members of the Department gave papers to the Canadian Ophthalmological Society; American Academy of Ophthalmology and Otolaryngology; Association for Research in Ophthalmology; University of Toronto Alumni Association; Ontario Medical Association; and the Section of Ophthalmology, Academy of Medicine, Toronto. Dr. H. L. Ormsby was a guest speaker at the opening of the Proctor Laboratories at the University of California, San Francisco. He also made a film on ocular bacteriology which was shown at the American Medical Association meeting in San Francisco.

Dr. G. A. Thompson completed a year of study abroad on a John S. McEachern Memorial Fellowship from the Canadian Cancer Society and has been appointed a Fellow in the Department. He is developing an ocular radiotherapeutic clinic in conjunction with the Department of Radiotherapy at the Toronto General Hospital, under Dr. C. L. Ash.

## Research

Members of the staff have undertaken the following research work:

Under the direction of Dr. H. L. Ormsby, Dr. Ann Fowle and Miss Anne Cockeram continued the study of the cultivation of ocular tissues in tissue culture. The techniques of the previous year for the growth of cornea were applied to the growth of conjunctiva. This work was aimed at finding a susceptible tissue for some of the ocular virsuses which had not yet been isolated. Successful isolation of viruses from cases of keratoconjunctivitis in tissue cultures of HeLa cells and monkey kidney have been obtained in recent months. Miss Frances Doane, in co-operation with Dr. A. J. Rhodes at the Hospital for Sick Children, has developed a new method of isolating the virus of herpes simplex in tissue cultures of rabbit cornea. This method will simplify the isolation of the virus from clinical cases of the disease and offers an improved method of studying antibody responses to the virus in sera. Dr. K. E. Schirmer has studied the effect of Diamox on the protein concentration of the aqueous in rabbits with anaphylactic iridocyclitis. Dr. J. S. Speakman has studied the effect of various methods of immunization with vaccinia virus on the resistance of the cornea to further inoculation of the cornea with the virus. He has also experimented with several technical problems in corneal transplants and has developed a mechanical trephine and two types of eyeball immolizers. Dr. E. Q. Harrison has grown autogenous cornea and conjunctiva in the anterior chamber of rabbits' eyes in a study of experimental epithelial downgrowth. Dr. Richardson has directed her work to pathological studies of the enucleated rabbit eyes. Dr. A. M. Crabb has studied the ocular penetration of Gantrisin with the aim of gaining more information on the treatment of B. proteus infections of the eye. He has also made a survey of the sensitivity of strains of the organism to the drug.

Under the direction of Dr. T. H. Hodgson, Dr. R. K. MacDonald has initiated studies to further our knowledge of the mechanism of cyclo-diathermy in the treatment of glaucoma. Experimental glaucoma has been produced by the application of heat to the globe overlying the ciliary body. Miss Susan Hennighausen is determining the effect of intravenous Diamox on the vitamin C concentration in the aqueous humour of rabbits. The expanding use of clinical tonography has produced a severe strain on personnel and space and has limited our pure research activities into the

cause of glaucoma; relief from this situation awaits the completion of the building programme of the Toronto General Hospital.

Dr. W. P. Callahan has been studying methods of slit lamp photography in conjunction with the Photography Department of St. Michael's Hospital. Dr. A. L. Morgan at the Hospital for Sick Children is continuing investigation into the problems of strabismus while Dr. J. S. Crawford is continuing work on ptosis of the eyelids.

At the Toronto Western Hospital, Dr. J. C. McCulloch is continuing work on the anatomy of the canal of Schlemm and adjacent structures. The members of the Department at the Hospital have jointly been working on the clinical investigation of glaucoma, the results of which were presented at the annual meeting of the Canadian Ophthalmological Society in June, as a symposium of five papers.

## Publications


Ballantyne, J. F. "Siderosis Bulbi" (*British Journal of Ophthalmology*, vol. 38, no. 12, Dec., 1954, pp. 727–33).

Callahan, W. P. "Eye Problems in Pre-School Children" (*Canadian Journal of Public Health*, vol. 47, no. 2, Feb., 1955, pp. 54–6).

——— "Injuries to the Eye" (*Bulletin of the Hospital for Sick Children*, Toronto, vol. 3, Nov., 1954, pp. 83–5).

Crawford, J. S. "Eye Injuries in Children" (*Canadian Journal of Public Health*, vol. 47, no. 2, Feb., 1955, pp. 64–6).

Elliot, A. J. "Recurrent Intraocular Haemorrhage in Young Adults (Eales' Disease): A Report of 31 Cases" (*Transactions of the American Ophthalmological Society*, vol. 52, 1955, pp. 811–75).

Fowle, Ann M. C. and Ormsby, H. L. "Growth of Cornea in Tissue Culture" (*American Journal of Ophthalmology*, vol. 39, no. 2, pt. II, Feb., 1955, pp. 242–6).

Hall, R. L., MacKneson, Ruth G., and Ormsby, H. L. "Studies of Immunity in Herpetic Keratitis in Rabbits" (*American Journal of Ophthalmology*, vol. 39, no. 2, part II, Feb., 1955, pp. 226–33).

Halliday, J. A. and Ormsby, H. L. "Carbomycin in Ocular Infections" (*American Journal of Ophthalmology*, vol. 39, no. 1, Jan., 1955, pp. 51–5).

Hausler, H. R. and Ormsby, H. L. "Penetration of Magnamycin into the Aqueous Humour of Rabbits" (*American Journal of Ophthalmology*, vol. 39, no. 2, pt. II, Feb., 1955, pp. 234–41).

McCulloch, J. C. "The Zonule of Zinn: Its Origin, Course and Insertion and its Relation to Neighbouring Structures" (*Transactions of the American Ophthalmological Society*, vol. 52, 1955, pp. 525–85).

MacKneson, Ruth G. and Ormsby, H. L. "Antibiotics and Herpes Simplex" (*American Journal of Ophthalmology*, vol. 39 no. 5, May 1955, pp. 689–91).

Macrae, Harry M. "Acute Injuries to the Eye" (*Ontario Medical Review*, vol. 22, May, 1955, pp. 373–5).

Moreside, J. W. "Present Status of Retrolental Fibroplasia" (*Bulletin of the Academy of Medicine*, Toronto, vol. 28, no. 2, Feb., 1955, pp. 118–23).

Morgan, A. L. "Strabismus should not be Neglected" (*Canadian Journal of Public Health*, vol. 47, no. 2, Feb., 1955, pp. 59–60).

Ogilvie, J. C., Ryan, J. E. B., Cowan, R. F., and Querengesser, E. I. "Interrelations and Reproducibility of Measures of Absolute Light Threshold and Scotopic Acuity" (*Journal of Applied Physiology* vol. 7, no. 5, March, 1955, pp. 519–22).

Ormsby, H. L. "Ophthalmia Neonatorum" (*American Journal of Ophthalmology*, vol. 39, no. 4, part II, April, 1955, pp. 90–5).

——— "Ophthalmia Neonatorum" (*Canadian Medical Association Journal*, vol. 72, no. 8, April, 1955, pp. 576–80).

Ormsby, H. L. and Fowle, Ann M. C. "Epidemic Keratoconjunctivitis" (*American Journal of Ophthalmology*, vol. 38, no. 4, Oct., 1954, pp. 490–4).

PATEL, B. S. "The Practice of Ophthalmology in India" (*Bulletin of the Academy of Medicine*, Toronto, vol. 27, no. 12, Sept., 1954, pp. 228–31).

QUERENGESSER, E. I. and ORMSBY, H. L. "Ocular Penetration of Erythromycin" (*Canadian Medical Association Journal*, vol. 72, no. 3, Feb., 1955, pp. 200–2).

WELSMAN, H. S. and MCCULLOCH, C. "The Fields of Vision and their Significance when projected into Space" (*Archives of Ophthalmology*, vol. 53, no. 5, May, 1955, pp. 694–9).

## *Oto-Laryngology*

*Under the direction of Professor P. E. Ireland*

The past year has been one of little change in this Department. We often wonder if the passage of time makes us more passive in our attitude to medicine and our specialty. If things are progressing with a minimum of disruption, we are more likely to leave them as they are—which is wrong. We have had sufficient postgraduate students, which was at one time a problem, and have had a satisfactory undergraduate training period.

The problem of speech and hearing is being considered by a very adequate committee and a University course in these two subjects is probably to be established in the near future. New equipment for hearing analysis will be required which will be of great assistance to the research into this problem. We are repeatedly asked for direction and advice by the Workmen's Compensation Board and industry on this question and it is hoped that we will soon be able to help them in this matter. Recent articles in one of our trade journals and the *Canadian Medical Association Journal* indicate the interest being aroused.

Our Department will supply a good portion of the programme of the Section of Otolaryngology at the combined British, Canadian, and Ontario Medical Associations' meetings in Toronto, as well as at the Canadian Otolaryngological Society meeting at Bigwin Inn which precedes the other meetings.

A year ago we were honoured by having Miss Esmé Hadfield, F.R.S.C., of the Radcliffe Infirmary, Oxford, attached to our service. This year we are establishing an exchange with the same institution, sending Dr. W. S. Goodman over there and having Mr. J. W. Dixon, F.R.C.S., from Oxford. These exchanges tend to bring us new ideas and better relations with British medicine. We will be further honoured by the visits this year of Mr. Victor Negus, F.R.C.S., and Mr. Terence Cawthorne, F.R.C.S., of King's College Hospital, London, and Mr. Ronald Macbeth, F.R.C.S., of Oxford. They are making an official visit to our Department as well as taking part in the Association meetings in June.

Dr. D. E. S. Wishart was President this year of the American Otological Society and conducted a most successful meeting at Hollywood Beach, Florida.

Professor Ireland and Dr. G. A. Henry were elected to the Council of the Canadian Otolaryngological Society. Professor Ireland continues on the executive committee of the American Board of Otolaryngology and is also President-Elect of the American Rhinological, Laryngological and Otological Society. He was also guest lecturer at the Southern Ear, Nose and Throat Society in Savannah, Georgia, in April.

Dr. Terence Molony and Dr. W. B. Wallace took part in the University of Toronto Medical Alumni Association meeting, both giving papers, and Dr. H. W. D. McCart participated in the postgraduate programme on cancer sponsored by the Ontario Medical Association. Dr. J. B. Whaley discussed "Deafness in Children" at the Ontario Teachers' Convention in Toronto.

Dr. K. McAskile has been elected Chairman of the Section of Otolaryngology, Academy of Medicine, Toronto. He has also been elected a Fellow of the American Rhinological, Laryngological and Otological Society. Dr. G. A. Henry has been

elected a Fellow of the American Broncho-Oesophagological Society and Dr. Brydon Smith elected a Fellow of the American Academy of Ophthalmology and Oto-laryngology.

## Research

Members of the staff have undertaken the following research work:

Dr. J. Brydon Smith, in association with Dr. Walter Johnson, has continued his studies on motion sickness and labyrinthine disturbances. This study is sponsored by the Royal Canadian Air Force and the Defence Research Board and includes clinical, as well as experimental, studies. An article has been published reporting the work done at St. Michael's Hospital.

Dr. D. P. Bryce is continuing his study of nerve deafness at the Toronto General Hospital and Sunnybrook Hospital, under a grant from Parke, Davis & Company. An early report on this interesting research will be given.

Dr. D. E. S. Wishart continues as director of the Hard of Hearing Clinic at the Hospital for Sick Children. Under his direction Dr. Page Statten has continued his study of psychogalvanic skin resistance tests and now has a large series of cases which will enable him to show the value of this test in the field of audiometry.

Dr. H. O. Barber has continued his clinical study of postural vertigo and post-traumatic syndrome. An article on this subject is now in press.

Dr. Terence Molony, supported by the O'Keefe Fellowship, continues his study of virus diseases in our specialty. Experimental study of these diseases in the upper respiratory tract is being initiated under the guidance of Professor C. E. van Rooyen and with the co-operation of the staff of the Ontario Veterinary College, Guelph.

Dr. Kenneth McAskile is continuing his study of the surgical treatment of the chronic ear and the problem of otosclerosis. His candidate's thesis on this subject for the American Rhinological, Laryngological and Otological Society is in process of being published.

Dr. Douglas Bell is establishing, with Dr. Fitzgerald at the Toronto Western Hospital, a clinic for the investigation of allergy in our specialty. This is a neglected field and should give us much useful information.

## Publications

Fearon, B. W. "The Management of Acute Laryngotracheitis" (*Canadian Medical Association Journal*, vol. 71, no. 5, Nov., 1954, pp. 482–4).

Fee, G. A. "The Present Status of the Fenestration Operation" (*Canadian Medical Association Journal*, vol. 72, no. 11, June, 1955, pp. 827–9).

Hadfield, Esme H. "The Surgical Treatment of Cancer of the Hypopharynx" (*Canadian Medical Association Journal*, vol. 72, no. 4, Feb., 1955, pp. 279–82).

Ireland, P. E. "The Surgical Pathology of the Nasopharynx" (*Canadian Medical Association Journal*, vol. 72, no. 3, Feb., 1955, pp. 186–9).

Ireland, P. E. and Barber, H. O. "Multiple Cranial Nerve Involvement in Ear Disease" (*Transactions of the Canadian Otolaryngological Society*, vol. 8, 1954, pp. 83–8).

Johnson, W. H. and Smith, J. B. "The Practical Testing of Vestibular Lesions" (*Canadian Medical Association Journal*, vol. 72, no. 6, Mar., 1955, pp. 439–41).

McCart, H. W. D. "Tracheal and Bronchial Papillomatous Implant showing Malignant Changes" (*Annals of Otology, Rhinology and Laryngology*, vol. 63, no. 2, June, 1954, pp. 498–500).

Wallace, W. B. "Foreign Body of Hypopharynx with Complications" (*Transactions of the Canadian Otolaryngological Society*, vol. 8, 1954, pp. 65–8).

Wishart, D. E. S. "Cure of Recurrent Adenoma of Bronchus in a Child of Seven" (*Transactions of the Canadian Otolaryngological Society*, vol. 8, 1954, pp. 57–61).

——— "The Hard of Hearing Infant" (*Annals of Otology, Rhinology and Laryngology*, vol. 63, no. 2, June, 1954, pp. 378–434).

Wishart, D. E. S., Whaley, J. B., and Wallace, W. B. "Rhinology in Children: Résumé of the Literature for 1953" (*Laryngoscope*, vol. 64, no. 9, Sept., 1954, pp. 707–53).

# *Paediatrics*

*Under the direction of Professor A. L. Chute*

The teaching programme in the two final years has been continued as outlined in last year's report.

The Accreditation Committee of the American Medical Association, which reviewed the various departments of the medical school last autumn, gave the Department a very good recommendation.

They pointed out one weakness in that there is a disproportionately large amount of didactic teaching in the third year. The Faculty Council have recommended that more clinical teaching be given, but this would appear to require a major reorganization of the entire third year time-table. Until this can be achieved, we shall attempt to give the lectures in the third-year theatre clinics as far as possible.

The Research Institute of the Hospital for Sick Children has issued a complete report of its activities. Excerpts from it, which pertain to the work of the Department of Paediatrics, are included here.

## Research

The Research Institute of the Hospital for Sick Children has been fortunate in expanding its facilities to include a metabolic ward for the study of various metabolic disorders under controlled conditions.

Dr. C. Collins-Williams and Mr. C. A. Best have carried out daily counts of air-borne pollen granules and mould spores by samples collected on the roof of the Hospital. These studies have shown that the "tree season" lasts predominantly from the first of April into the second week of July, the "grass season" from the fourth week of May through July, and the "weed season" through August and September. Studies on moulds have shown that the peak season for spores is from the middle of July to the middle of October. These findings are of considerable importance in the proper evaluation and treatment of allergic patients.

Dr. Gladys Boyd has continued her investigation of the treatment of tuberculous meningitis and other forms of tuberculosis with the newer anti-tuberculous drugs. Extremely satisfactory results have been obtained in the treatment of tuberculous meningitis, and the changed mortality picture in this disease represents one of the major advances in the treatment of infectious diseases in recent years.

Dr. S. H. Jackson has continued his studies of some years' duration on fluorine metabolism. Experiments on fluorine absorption and retention in rats have been completed. The fluorine concentration in the total body ash has been found to reach a constant value directly proportional to the mean dietary intake. The extent of the daily variation about the mean value has no effect on the amount of fluorine stored.

Dr. A. Sass-Kortsak has maintained an active programme throughout the year on liver disease, malnutrition, and serum proteins. In co-operation with Dr. Wolfish, a study of absorption tests in cases of malnutrition was performed. Dr. Sass-Kortsak has paid particular attention to the differential diagnosis of obstructive jaundice in infancy. During the year, approximately twenty patients have been studied in detail. Many types of liver function tests have been carried out, with some interesting results. Full evaluation of this study will only be possible when further values for normal children of the same ages have been obtained.

Dr. Donald Fraser is continuing an investigation of calcium and phosphorus metabolism in cases of resistant rickets and other interesting conditions. He is collaborating with Dr. Murphy and Dr. McGreal in a study of the causes of twitching in the neonatal period. The main objective of this study is the development of methods of differentiation between true tetany of the newborn and other causes of twitching.

Dr. M. A. Cox and Dr. G. Nikiforuk have completed their field and laboratory study of dental caries. No correlation between the blood and salivary urea and the

dental caries increment was detected. There was no significant correlation between dental caries and the ammonia nitrogen in the saliva. Studies on forty caries-immune children showed that there was a significant difference in the blood urea levels of these children as compared to those of a group of randomly selected controls. This finding was interpreted as being caused by differences in dietary habits between the two groups.

Dr. A. L. Chute and Dr. R. Farber have investigated the value of fructose as an intravenous infusion. Dr. Chute and Dr. J. D. Bailey have started an investigation of certain aspects of salicylate poisoning.

Dr. Chute and Dr. C. P. Rance brought to a close their study on the use of ACTH and cortisone in the therapy of the nephrotic syndrome. During a four-year period, ninety children were studied. Remissions were obtained in 75 per cent of children. These were seldom permanent, and in the last year various methods of prolonged therapy with cortisone were used in an attempt to prolong remission. On completion of this study, Dr. Chute and Dr. Rance turned their attention to the study of two biochemical abnormalities in the nephrotic syndrome, namely the high serum cholate and the increased urinary excretion of glycocyamine, which suggests a transmethylation defect in the liver. It seems that high serum cholate frequently accompanies high serum cholesterol, and that the urinary excretion of glycocyamine is generally increased in nephrotic children, but may return rapidly to normal in a remission.

Dr. J. D. Keith, Dr. R. D. Rowe, Dr. P. Vlad, Dr. P. Swyer and Dr. G. H. Watson have continued their investigations of congenital heart disease and rheumatic fever. Progress has been made in the identification and study of the Tetralogy of Fallot, pulmonary stenosis with patent foramen ovale, pure pulmonary stenosis, patent ductus arteriosus, tricuspid atresia, ventricular septal defect, single ventricle, coarctation of the aorta, truncus arteriosus, aortic atresia, Eisenmenger's complex, auricular septal defects, anomalies of the venous return, and other less common defects. It is of considerable interest to note that as a direct result of the exhaustive studies of Dr. Keith and his associates, many successful operations have been performed on the heart and vessels by Dr. W. T. Mustard. Progress has been made in the evaluation of ACTH, cortisone, and salicylates in the therapy of rheumatic fever.

Dr. Norma Ford Walker, with the assistance of Dr. Irene Uchida and a number of graduate students, has continued her investigation into genetic aspects of diseases in children.

Dr. C. E. Snelling and Dr. Alice Goodfellow have continued their study on infant mortality and morbidity in six of the Toronto hospitals.

Dr. J. M. M. Darte, a full-time Fellow of the Ontario Cancer Treatment and Research Foundation, is making a particular study of cases of malignant diseases admitted to the Hospital, and is collaborating closely with members of the surgical staff. Dr. Darte has made a start on the study of coagulation of the blood of newborn infants.

Under the direction of Dr. W. A. Hawke, Dr. W. R. Keeler has continued his investigations of childhood schizophrenia. Over thirty children and their parents have been examined by Dr. Keeler and the two psychologists, Dr. Wideman and Mr. Thomas. Many interesting observations have been made, particularly in regard to the possible role of genetic factors in the aetiology of this condition, and considerable progress has been made.

Dr. J. S. Prichard and Dr. D. McGreal have commenced a study of convulsive disorders. Approximately eighty patients aged up to seven years were examined because of convulsions; forty-five were admitted and the remainder were seen as out-patients. Various biochemical and other tests have been carried out, and the patients have been placed on a register for follow-up. A comparison of the effect of drugs on the acute stage of the convulsive process is in progress.

Dr. A. J. Rhodes has had the assistance of Dr. A. J. Beale, Dr. Ann Peach, Mrs.

Darline Duncan, Miss Norma Davis, Miss Frances Doane and Mr. W. Stakiw. The Virus Research Department of the Hospital has functioned as a centre for typing poliomyelitis viruses isolated in all parts of Canada. Approximately 100 strains of virus have been typed and over 90 per cent have been found to belong to Type I. This type is represented among strains isolated in Ontario from 1948 onwards.

### Publications

Boyd, Gladys. "Surgical Treatment and Nonpulmonary Tuberculosis: End Results of Tuberculous Meningitis in Children"; in *Transactions of the Fiftieth Anniversary Meeting of the National Tuberculosis Association*. 1954.

Boyd, Gladys, and Wilkinson, F. R. "Pulmonary Resection in Childhood Tuberculosis" (*Diseases of the Chest*, vol. 26, no. 4, Oct., 1954, pp. 442–51).

Collins-Williams, C. "Dermal Allergy in Children" (*Ontario Medical Review*, vol. 21, Dec., 1954, pp. 747–51).

——— "Gastrointestinal Allergy in Infancy" (*Journal of Pediatrics*, St. Louis, vol. 45, no. 3, Sept., 1954, pp. 337–46).

Collins-Williams, C., and Ebbs, J. H. "The Use of Protein Skin Tests in the Celiac Syndrome" (*Annals of Allergy*, vol. 12, May-June, 1954, pp. 337–46).

Collins-Williams, C. and Ratner, B. "Pediatric Allergy: A Critical Review" (*Annals of Allergy*, vol. 13, March-April, 1955, pp. 196–227).

Darte, J. M., Dacie, J. V., and McSorley, J. G. A. "Pelger-like Leucocytes in Chronic Myeloid Leukemia" (*Acta Haematologica*, vol. 12, no. 2, 1954, pp. 117–24).

Fraser, D., Yendt, E. R., and Christie, F. H. E. "Metabolic Abnormalities in Hypophosphatasia" (*Lancet*, vol. 1, Feb. 5, 1955, p. 286).

Keith, J. D., Rowe, R. D., and Vlad, Peter. "The Electrocardiogram in Primary Endocardial Fibroelastosis" (*British Heart Journal*, vol. XVII, April, 1955, pp. 189–97).

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Rhodes, A. J., Duncan, D., and Peach, Ann M. "Typing of Eighty-eight Strains of Poliomyelitis Virus by Tissue Culture Methods" (*Canadian Journal of Public Health*, vol. 45, Sept., 1954, pp. 396–402).

Rhodes, A. J., McNaughton, G. A., Duncan, D., Johnson, C. C. R., and Wood, W. "Aseptic Meningitis: Isolation of Coxsackie and Unidentified Cytopathogenic Viruses from Cerebrospinal Fluid by Tissue Culture Methods" (*Canadian Journal of Public Health*, vol. 46, Jan., 1955, pp. 1–8).

Rhodes, A. J., and Peach, Ann M. "Further Investigation into the Association between Immunizing Injections and Paralytic Poliomyelitis" (*American Journal of Public Health*, vol. 44, no. 9, Sept., 1954, pp. 1185–8).

Robertson, E. Chant, and Hames, P. J. "Nutritive Value of Low Income Families' Diets" (*Journal of the American Dietetic Association*, vol. 30, no. 8, Aug., 1954, pp. 766–73).

Snelling, C. E., Donohue, W. L., Mullinger, M. A., and Cook, E. G. "Survey of the Rh Problem in Toronto, 1947–1952" (*American Journal of Obstetrics and Gynaecology*, vol. 67, no. 2, Feb. 1954, pp. 233–47).

## *Pathological Chemistry*

*Under the direction of Professor James A. Dauphinee*

No important changes have been made in the staff or in the teaching programme during the past year.

One hundred and fifty-two undergraduate and 12 graduate students have been enrolled in the courses given by the Department during the session 1954–5. Of the graduate students, 1 has been enrolled for the B.Sc.(Med.), 1 for the M.A., 7 for

the Ph.D., and 3 have been taking Ph.D. minors in Pathological Chemistry. Two of the Ph.D. candidates, Mr. Harvey Stancer and Mr. Jonas Maurukas, have completed their Ph.D. programmes this year.

Dr. S. J. Klebanoff, who received his M.D. degree from this University in 1951 and his Ph.D. from the University of London in 1954, has joined the Department as a National Research Council Medical Research Fellow and has been a very welcome addition to our research group.

The facilities of the Department for teaching both graduate and undergraduate students have been considerably increased by the transfer of the Division of Synthetic Chemistry (under Professor E. Baer of the Department of Medical Research) from the fourth to the fifth floor of the Banting Institute and by the changes made in Room 351B which permit it to be used as a seminar and conference room. The alterations in Rooms 518 and 517 have been completed and this space is now being used to good advantage by Dr. Wm. Paul and his group who are making radioactive isotopes and various biophysical methods available for a variety of clinical studies.

## Research

The members of the Department have pursued a considerable number of investigations of their own and they have also participated actively in researches which are being carried on in the various clinical departments of the Faculty of Medicine and in the Clinical Investigation Unit of Sunnybrook Hospital. By its very nature the Department of Pathological Chemistry is particularly well equipped to conduct the laboratory studies necessary in the investigation of disease in the human patient. The new Biophysics section, developed by Dr. Wm. Paul and financed by a generous gift from the Atkinson Charitable Foundation, has further increased our facilities for assisting in clinical studies. Such studies, however, can only be successfully undertaken when they are done with the full co-operation of the various clinicians and institutions which have the patients under their care and this we have received in full measure. This interdepartmental collaboration has been a great source of satisfaction to us and we hope that it has been equally satisfactory to the other parties concerned.

Dr. Dauphinee and Dr. Patzauer, in close collaboration with Dr. Sinclair of the Department of Medicine, have continued the investigations of the factors responsible for the occurrence of ascites in patients with cirrhosis of the liver. The inability to excrete sodium ions and the active retention of practically all the sodium ingested is an outstanding abnormal finding in these patients and is closely allied to the excessive retention of fluid. The fact that nitrogenous waste products and all other electrolytes are excreted in a normal manner suggests that the abnormal sodium retention is brought about by an excessive reabsorption of sodium by the renal tubules and that this may be caused by an increased production of specific sodium-retaining mineralo-corticoids such as aldosterone by the adrenal gland. This matter is being further pursued with the help of Dr. Gornall who is determining the urinary excretion of aldosterone in a number of these patients. Other investigations designed to investigate the abnormalities of carbohydrate, lipid and protein metabolism in these patients are also being carried on.

Mrs. Danoff has continued her studies of possible ammonia precursors in the blood of patients with hepatic coma.

Dr. Harold Kalant has made a detailed study of the absorption and fluorescence spectra of various steroids treated with concentrated sulphuric and phosphoric acids. By this means the fluorometric analysis of the adrenal steroid hormones is being placed on a sounder basis and it appears probable that measurement of individual steroids in a mixture will be possible. He has also initiated a study of the exchange of amino acids, glucose and electrolytes between skeletal muscle and circulating plasma and he is determining the effect of specific adrenal cortical hormones upon this interchange.

Dr. S. J. Klebanoff has continued his investigations which are concerned with

the intracellular biochemical abnormalities which lead to and result from the diabetic state. A study of the diabetogenic action of alloxan, with particular reference to the selective nature of the toxicity, has emphasized the importance of pH in the rate of degradation of alloxan and thus in its toxicity. The selective action of alloxan is considered to be due, in part, to a relative acidity of the beta cells of the islets of Langerhans. He has also investigated the factors affecting the ratio of oxidized to reduced glutathione in tissues. Because of its sulphydryl-disulphide equilibrium this substance is an extremely important regulator of cellular metabolism. The maintenance of the normally high proportion of reduced glutathione has been shown to depend upon the oxidation of carbohydrate and to be influenced by the diabetic state.

Mr. C. E. Downs has developed chromatographic techniques for the separation and identification of small amounts of carbohydrates and these are to be applied to a study of the carbohydrate moieties in the mucoproteins in the plasma of diabetes and other illnesses.

Dr. Alan Bruce-Robertson has improved the technique of the paper electrophoresis procedure for the separation of the various fractions of the plasma proteins and has applied this procedure to a study of the plasma protein abnormalities which are to be found in rheumatoid arthritis and other diseases.

### (b) *Reported by Professor T. F. Nicholson*

Dr. G. R. Cumming has studied the renal clearances of creatinine and inulin in the rat and has confirmed the suggestion that in the rat, as in man, creatinine is probably excreted by the renal tubules. He has however, found evidence which suggests that the mechanism of excretion of creatinine in the rat differs from that in man. In the course of this investigation Dr. Cumming compared various methods for determining inulin. He found that the anthrone method, while suitable for aqueous solutions, urine and human plasma, could not be used to determine inulin in dog plasma, as it consistently gave results which were 10–12 per cent too low. Dr. Cumming has also studied the effect on inulin of boiling in alkaline solution and has found that, contrary to the claims of some investigators, there is no "alkali stable inulin."

Dr. E. M. Tanz has studied the immediate and long-term effect of removing varying proportions of the kidney on renal function.

Mr. C. H. Downs has completed a comparison of various methods of determining urea in blood and urine.

### (c) *Reported by Professor A. G. Gornall*

During the past year methods have been investigated for the hydrolysis, extraction and analysis of adrenal steroids, particularly aldosterone, in urine extracts. Mrs. C. Gwilliam has improved considerably the chromatographic isolation and measurement of aldosterone. Mr. A. E. D. Hall has worked out conditions which give nearly quantitative recovery of urinary steroids in a pH 2 extract which is clean enough for chromatography. Miss R. Nakashima has studied hydrolysis of the steroid conjugates with glucuronidase and has shown that while the glucuronides are split in 24–36 hours the acetate buffer alone causes a slow release of steroids that continues for at least seven days.

In collaboration with Dr. D. Kumar of the Department of Obstetrics and Gynaecology, Mr. Hall has made a study of the chronic effects of low doses of aldosterone in rats. Preliminary data on the aldosterone content of the urine and placentas of patients with eclampsia has also been obtained. Dr. S. Munroe has collaborated on a part-time basis in a study of the effects of adrenal cortical extracts and aldosterone on diabetic ketosis in dogs.

Miss D. Strachan has compared the method of Vestergaard with the standard procedure of the Medical Research Council for 17-ketosteroid determinations and finds the former simpler and satisfactory for our clinical investigations. Mrs. M.

Marten is making a comparison of recent methods for determining urinary adrenal corticoids.

Mrs. P. Barrow has continued our study of extracts of ground-hog hibernating gland in collaboration with Dr. W. G. Bigelow of the Department of Surgery. Further evidence that these extracts contain a water soluble principle that can influence cold tolerance has been obtained.

Mrs. T. Menon has continued her research on the effect of hormones on those enzyme systems which regulate the metabolism of glucose. Mr. B. Eglitis has initiated his graduate programme with a study of adrenalin and noradrenalin in relation to the problems of mental illness.

In the Clinical Investigation Laboratory Mrs. H. Pavuls and Mrs. V. Reinholds have carried out determinations of adrenal corticoids and nitrogenous substances excreted during metabolic studies of patients with various diseases.

The following problems have been under investigation in collaboration with the clinical departments: (1) "Metabolic and Hormonal Abnormalities in Liver Disease"—with Drs. J. A. Dauphinee, J. C. Sinclair and M. Shafran, Department of Medicine; (2) "Steroid and Metabolic Studies in Arthritis"—with Drs. A. A. Fletcher, M. A. Ogryzlo, A. Carter and P. Rosen, Clinical Investigation Unit, Sunnybrook Hospital; (3) "Hormonal and Metabolic Studies in Periodic Catatonia" —with Dr. J. Lovett Doust, Dr. A. Bonkalo and Mr. B. Eglitis, Department of Psychiatry; (4) "Endocrinological Studies in Thyroid Disease"—with Drs. M. W. Johnston and J. Vale, Department of Medicine; (5) "Aldosterone Excretion in Salt-retaining Syndromes"—with the co-operation of several clinical departments.

### (d) *Reported by Professor W. Paul*

Completion of the expanded laboratory facilities this year was followed by an increase in scope of research already under way and a start on at least one new research project.

Miss A. Britton in co-operation with the Department of Therapeutics has investigated the metabolism of plasma phospholipid using radiophosphate as a tracer. She has shown a diminished rate of phospholipid formation following the administration of growth hormone. This previously unreported effect led to the study of acromegaly and the finding of a low rate of phospholipid formation in this condition. Other endocrinological conditions including anterior pituitary insufficiency and Cushing's disease have also been studied.

The quantity of radioactive material handled by the laboratory has increased owing in part to several procedures which may now be considered routine rather than investigative. Two new isotopes have been employed: radioactive chromium as an aid to haematological studies and radioactive gold in lymphatic flow studies in dogs. Radioactive phosphorus continues to be used for localization of brain and eye tumours as well as for treatment in certain cases of lymphoma, leukaemia and polycythaemia. Preliminary experiments are under way for the external localization of brain tumours with radioactive positron emitters such as Arsenic 74.

Further development on the oximeter has been postponed to allow its full-time use in the Heart Laboratory, Toronto General Hospital, for cardiac and pulmonary investigations by members of the Department of Medicine.

Graduate students have completed the following theses for the Ph.D. degree:

STANCER, HARVEY C. Syntheses in the field of phospholipides.
MAURUKAS, JONAS. Synthesis and investigation of the phosphatidyl serines.

In both these cases the research programme was under the direction of Professor E. Baer of the Department of Medical Research.

### Publications

Barlow, J. C. and Gornall, A. G. "The Effect of Intestinal Perfusion on Water and Electrolyte Balance of the Anuric Dog" (abstract) (*Revue canadienne de biologie*, vol. 13, no. 5, Dec., 1954, p. 448).

Dauphinee, J. A. "Fluid and Electrolyte Therapy: Fundamental Aspects" (*Bulletin of the Academy of Medicine*, Toronto, vol. 27, no. 11, Aug., 1954, pp. 210–16).

——— "Hormonal Regulation of Body Electrolytes: The Role of the Adrenal Steroid—A Brief Review" (*Canadian Journal of Biochemistry and Physiology*, vol. 33, no. 3, May, 1955, pp. 493–505).

Gornall, A. G., Gwilliam, C., and Kumar, D. "A Microchemical Estimation of Aldosterone" (*Revue canadienne de biologie*, vol. 13, no. 5, Dec., 1954, p. 466).

Gornall, A. G. and Kalant, H. "Simple Adaptation of the Beckman DU Spectrophotometer as a Spectrofluorometer" (*Analytical Chemistry*, vol. 27, no. 3, March, 1955, pp. 474–5).

Kalant, H. "Fluorometric Assay of Adrenal Cortical Steroids treated with Phosphoric Acid" (*Revue canadienne de biologie*, vol. 13, no. 5, Dec., 1954, p. 476).

Kalant, H. and Ducci, H. "The Influence of Diet on Urinary Amino Acid Levels" (*Journal of Clinical Endocrinology and Metabolism*, vol. 15, no. 4, April, 1955, pp. 481–6).

Kalant, H., Lee, R., and Sellers, E. A. "Metabolic Fate of Radioactive Thyroid Hormones in Normal and Propylthiouracil-Treated Rats" (*Endocrinology*, vol. 56, no. 2, Feb., 1955, pp. 127–34).

Robson, T. B. and Gornall, A. G. "Pregnanediol Assays and the Abortion Problem" (*Canadian Medical Association Journal*, vol. 72, no. 11, June 1, 1955, pp. 830–4).

## *Pathology*

*Under the direction of Professor J. D. Hamilton*

The graduate course in Pathology given by Dr. Wm. Anderson proved very popular, with more than 100 internes and fellows attending throughout the academic session. Dr. Anderson instituted conferences for graduate students and the attending staff of the University hospitals in dermatology, orthopaedic pathology, and gynaecological pathology. These, too, have been well attended.

Under the direction of Drs. Barrie and Ezrin a combined clinical pathological conference was inaugurated and held monthly, for the staff of Ward G of the Toronto General Hospital. This has met with approval and will be continued.

Dr. Ritchie has also instituted a monthly conference on haematological problems.

Dr. Hamilton attended the Teaching Institute on Pathology at French Lick Springs, held under the auspices of the Association of American Medical Colleges. Discussions in small groups continued for five days, and were productive. It was evident that the old methods of teaching pathology by organs and systems had fallen into disrepute, and that teachers of pathology were searching for some means of imparting to students the dynamic nature of pathological processes. Emphasis was placed on experimental pathology, group teaching, and preceptorships, but a suitable balance of these approaches did not appear to have been achieved anywhere, in Dr. Hamilton's opinion.

The only change of note in the undergraduate course has been the introduction of group teaching in surgical pathology and paediatric pathology. Each student attended two sessions in each of the above during the latter half of the year, on Friday afternoons. It is proposed to expand this method of teaching by sending students, in groups of fifteen, to the various University hospitals once a week.

It is becoming increasingly apparent that the various activities of the Department are out of balance and in conflict. The service responsibilities to the hospital are increasing annually. Graduate teaching, involving one or two conferences and totalling two or three hours a week fifteen years ago, has expanded to fourteen hours

a week during the past year. Collaboration in research projects with other departments has developed at an alarming rate. The net result is that the full-time members of the departmental staff are having increasing difficulty in pursuing their own researches, and giving as much time and thought to undergraduate teaching as they should. Methods of undergraduate teaching have not changed in the Department in the past twenty-five years, and during this time the approach to pathology and the emphasis on what is essential has changed. More important, the number of students has increased by one-third. Most teaching is done with the whole class, the only group teaching being a series of twenty demonstrations given to students in groups of fifteen. As indicated above, an attempt has been made to expand group teaching by sending students to the University hospitals for one session per week. Only half the class can be sent at one time, and the remaining 75 students must be taught as one group in the Department. Additional full-time members of the teaching staff provide the only solution to our problem.

Through the National Cancer Institute, McEachern Travelling Fellowships were granted to Drs. C. R. McLean, R. C. Ross, Wm. Anderson and T. C. Brown, who each spent several weeks in advanced studies of tumour diagnosis in New York and Boston.

## DIVISION OF NEUROPATHOLOGY

*Under the direction of Professor E. A. Linell*

The Division appreciated the services of Dr. Igor Klatzo for three months during the current year as a Voluntary Fellow. He has accepted an Assistant Professorship in Neuropathology, University of Toronto, beginning on July 1, 1956.

### Research

Dr. J. D. Hamilton has continued with morphological studies of primary biliary cirrhosis. This work has been greatly assisted by the loan of material from the Rockefeller Institute for Medical Research. In collaboration with Dr. Gerald Wrenshall of the Banting and Best Department of Medical Research, an investigation of the nature of the diabetic syndrome in patients with Kimmelstiel-Wilson lesions in the kidney has made progress. With the assistance of Dr. M. M. Abbott, the study of coronary artery disease has continued, using the injection and clearing techniques previously described. This is a long-term project, requiring large numbers of cases, but to date sufficient evidence is available to indicate that some of the controversial mechanisms of coronary thrombosis may be clarified. The anatomical study of the bronchi and lungs in smokers and non-smokers, begun by Dr. W. S. Hartroft, has continued with the collaboration of Drs. T. C. Brown and F. W. Macdonald. This, too, is a long-term project, which to date has not been too productive.

Dr. H. J. Barrie with the assistance of Mrs. H. Hausler, has been continuing studies on the responses of the renal calyx to drugs, and has been doing some studies for the Royal Canadian Air Force on the pathology of air crashes.

Dr. R. C. Ritchie has continued his researches on lymphosarcoma in maskinonge, with very stimulating results. The tumour has been successfully transplanted, and in addition induced in fingerlings with cell-free filtrates. The exact nature of the tumour remains obscure, but its natural history is gradually becoming clearer. This work would not be possible without the continued co-operation and support of the Department of Lands and Forests of the Province of Ontario, and the National Cancer Institute.

Dr. J. L. Blaisdell, in collaboration with the Departments of Obstetrics and Gynaecology and of Paediatrics, has continued the study of neonatal and stillbirth mortality. The value of the study is shown by the increased interest of pathologists in the problem, resulting in improved records and a more precise analysis of individual cases.

Dr. Calvin Ezrin, with the assistance of Drs. Horsey and M. Hill, has continued research on the pituitary and hypothalamus. The preliminary investigation of the

monkey pituitary has been facilitated by the co-operation of the Connaught Laboratories; preparations for the next phase of the project, the induction of lesions in the hypothalamus, are complete and will commence when monkeys become available. This research is being conducted jointly with the Departments of Medicine and Surgery.

Dr. Wm. Anderson, with the assistance of Drs. J. B. Sherry and R. M. Clark, and the interne staff, has continued his analyses of surgical material, and during the past year has completed reviews of rheumatic activity in the auricular appendage removed during mitral commissurotomy; lymphoepithelioma; tumours of tendon sheaths; laryngeal tumours; carcinoma arising in endometriosis; adenoma of Brunner's glands. A report on carcinoma of the body of the uterus was published with the collaboration of Dr. W. G. Cosbie, and several of the above-mentioned reviews have been accepted for publication. Dr. Anderson has continued to give valuable assistance to the Department of Surgery in various investigations in which study of biopsy material is an integral part. Under a grant from the National Research Council, Dr. Anderson is investigating osteoarthritic lipping of joints. He is also working with the Department of Pathological Chemistry on the effects of aldosterone.

Drs. Barrie, Ritchie and Blaisdell have collaborated in research projects with the Department of Surgery and the Connaught Laboratories. Dr. Hamilton in collaboration with Dr. T. E. Roy of the Department of Bacteriology and Dr. L. Greenberg of the Department of National Health and Welfare completed and published a study of wound infection.

### *Division of Neuropathology*

### *Reported by Professor E. A. Linell*

Dr. Linell is preparing two papers to present to the Second International Congress of Neuropathology to be held in London in September, "The Malignancy of Cerebral Astrocytoma" in collaboration with Drs. H. H. Tucker and K. G. McKenzie, and "Leptomeningeal Cysts of the Cerebral Hemispheres" in collaboration with Drs. S. P. Starkman and T. C. Brown.

Dr. Gordon Mathieson made a study of the pathology of arterio-venous malformations of the brain in collaboration with the Department of Pathology of the Hospital for Sick Children. This paper was delivered to the Academy of Medicine, Toronto, in March.

In collaboration with the Department of Surgery, Dr. T. P. Morley has organized and equipped a laboratory in the Division for the tissue culture of brain tumours. The objective is a scientific appraisal of the effects of X-rays and other physical agents on the different types of brain tumours.

#### Publications

Clark, R. M. and Linell, Eric A. "Case Report: Prenatal Occlusion of the Internal Carotid Artery" (*Journal of Neurology, Neurosurgery and Psychiatry*, vol. 17, no. 4, Nov., 1954, pp. 295–7).

Donohue, W. L. and Uchida, Irene. "Leprechaunism: A Euphuism for a Rare Familial Disorder" (*Journal of Pediatrics*, vol. 45, no. 5, Nov., 1954, pp. 505–19).

## *Pharmacology*

### *Under the direction of Professor J. K. W. Ferguson*

For the third year the Department of Medicine has co-operated with the Department of Pharmacology to give a series of clinical pharmacological conferences to students of the third medical year, in order to reinforce and extend the instruction in Pharmacology given in the second medical year. The method of conducting

the conferences was changed, presumably for the better, since attendance of the students (which was not compulsory) was better this year than last.

Additional space which was allocated this year to the Department has greatly improved our facilities for research and for the teaching of graduate students, and has been a source of great satisfaction.

Of the 8 graduate students working in the Department, 5 were registered for the Ph.D. degree, 1 for the M.A., 1 for the B.Sc.(Med.), and 1 for studies preliminary to registration for the M.A.

## Research

Professor Ferguson has continued his studies on substances which alter the metabolism of ethanol and its effects on the circulation. He has also begun an investigation of a series of derivatives of theophylline to discover their effectiveness as diuretics and anti-histaminic agents.

Professor G. H. W. Lucas, with the assistance of Miss M. O. Maykut, has continued an investigation of substances for possible use as local anaesthetics with a long duration of action. He has also collaborated with Dr. W. T. Oliver of the Ontario Veterinary College in devising a method for the recovery and identification of strychnine from biological fluids.

Professor W. Kalow has developed methods for measuring with increased precision the activity of serum cholinesterase in blood and has demonstrated a striking relation between the local anaesthetic potency of many drugs and their capacity to inhibit serum cholinesterase. With Mr. H. A. Lindsay he has compared the accuracy of various methods of measuring serum cholinesterase and has studied the variations in the activity of serum cholinesterase in human blood in health and disease.

Mr. A. E. Dyer has perfected a technique for producing ventricular fibrillation and abolishing it at will by the application of alternating currents to the intact thorax. With this technique he has compared various general anaesthetics for their ability to render the heart susceptible to fibrillation induced by epinephrine.

Graduate students have completed the following theses:

*For the M.A. degree*

Maharajh, M. R. The effects of ethanol, disulfiram and cyanamide on bleeding volume.

## Publications

Conn, A. W., Dyer, A. E., and Ferguson, J. K. W. "Factors affecting Trichlorethylene Vapour Concentrations" (*Canadian Anaesthetists' Society Journal*, vol. 2, no. 2, April, 1955, pp. 178–83).

Dyer, A. E. and Ferguson, J. K. W. "Fibrillation and Defibrillation in Dogs after Chloroform and Epinephrine" (*Journal of Pharmacology and Experimental Therapeutics*, vol. 112 no. 4, Dec., 1954, pp. 424–31).

Ferguson, J. K. W. "Cholinergic Blocking Drugs"; in *Pharmacology in Medicine, a Collaborative Textbook*, ed. Victor A. Drill, pt. 7, section 27, pp. 1–10. New York, Toronto, London: McGraw-Hill Book Company Inc. 1954.

Ferguson, J. K. W. and Lucas, G. H. W. *Henderson's Materia Medica.* Toronto: University of Toronto Press. 1954. Pp. 326.

Ferguson, J. K. W., Maharajh, M., and Warson, M. D. "Effect of Derivatives of Cyanamide with and without Ethanol on Bleeding Weights of Rats and Mice" (*Journal of Pharmacology and Experimental Therapeutics*, vol. 113, no. 1, Jan. 1955, pp. 20–1).

Maykut, Madelaine O. and Kalow, Werner. "Experiments with Animals on the Combined Action of Procaine and Barbiturates (*Canadian Anaesthetists' Society Journal*, vol. 2, no. 2, April, 1955, pp. 109–15).

# *Physiology*

*Under the direction of Professor Charles H. Best*

The Department was moved in June 1954 from the Medical Building, where it had been since 1903, to quarters in the new Institute. The various laboratories were soon in operation, and the work was continued with little disturbance. The new research and class laboratories are very efficiently disposed and well-equipped. They are a source of much satisfaction and of hope for the future. We are indeed grateful to all the individuals and groups who co-operated in providing them. The room with controlled temperature and humidity and the sound-proofed laboratory extend the range of the teaching facilities. It may be noted, however, that there is still need for more teaching laboratory accommodation, and hopes are entertained that this may be provided in the future. The Institute has been visited by members of the Canadian Physiological Society, the Toronto Diabetes Association, the Royal Society of Canada, the British Medical Association, the Canadian Medical Association, the second medical year students, and individuals from this and other universities.

Courses in Physiology were given to approximately 650 students from various faculties and schools of the University. For this instruction eight separate courses were organized, and with them five laboratory courses were given. At the Physiological Journal Club, papers were presented by senior undergraduate students and discussed by the students and staff members. Senior undergraduate students in the Physiology option of the course in Physiology and Biochemistry also had special research problems under the direction of staff supervisors.

Graduate students under the School of Graduate Studies are enrolled in certain of these courses. A special course is given to graduates in Dentistry. Twelve graduate students were proceeding towards the degree of Doctor of Philosophy, with Physiology, as the major subject, and 5 of them received the degree during the session. The Master of Arts degree was conferred on 2 students, and 4 additional students were doing graduate work in the Department. Members of the Banting and Best Department of Medical Research gave valuable and indispensable aid in the lecture and laboratory classes and in graduate teaching.

At meetings of the Physiological Society of the University of Toronto twelve papers were presented by members of the University staff and the following visitors: Sir Howard Florey of the University of Oxford; Dr. A. E. Harper of the University of Wisconsin; Dr. S. J. Patrick of the University of the West Indies; and Dr. E. K. Trethewie of the University of Melbourne, Australia. The School of Graduate Studies made possible a visit by Dr. Jacob Furth of the Children's Cancer Research Foundation, Boston.

## Research

Members of the staff have undertaken the following research work:

Dr. R. E. Haist and his group have continued their investigations of the effects of endocrine glands on the exocrine pancreas, factors influencing the endocrine pancreas, and shock secondary to injury. Dr. Rosemary D. Hawkins, Dr. Margaret T. Nishikawara and Dr. B. Hassig have found that growth hormone, ACTH and cortisone administration increased the weight of the pancreas in hypophysectomized rats. In these animals ACTH and cortisone increased the pancreatic amylase and trypsin activity, but growth hormone and desoxycorticosterone acetate did not. Dr. S. V. Feinman studied experimental pancreatitis in rats and the influence of endocrine factors in its development. Dr. M. A. Ashworth and Mr. B. Kinash have continued their investigations of factors influencing the islets of Langerhans, including the effects of vitamin supplements and of the continuous infusion of glucose combined with ACTH and with growth hormone administration. Mr. Kinash has shown that the continuous infusion of glucose does not lead to a significant increase

in islet weight when the pituitary gland has been removed. Dr. Pushpa Raghunath has begun experiments on factors influencing ketone body tolerance in rats. Mrs. L. C. Smith has continued her work on the efficacy of dextran solutions of different molecular weights in shock secondary to injury and, using the most effective of these, is attempting to find the best method of administration. The influence of shock and infusion on body temperature has been followed. In connection with the shock problem, Mr. S. Sidlofsky has been attempting to develop a method for studying the arterio-venous shunts at the bases of the villi in the intestine.

The programme of research under Dr. E. A. Sellers has continued actively. Tumours of the thyroid and of the pituitary glands were produced by an endocrine imbalance resulting from the prolonged administration of propylthiouracil and thyroid hormones. Dr. Ingeborg C. Radde has compared the metabolism of radiothyroxine, radioiodothyronine and radioiodine in animals with these tumours and in normal animals. In the Radiation Unit supported by the Defence Research Board, Dr. J. C. D. Barlow has found that after X-irradiation of the whole body the survival rate of rats is not modified by batyl alcohol (provided by Dr. E. E. F. T. Baer), growth hormone or dextran. The current studies on animals exposed to radiation include: (1) determination of electrophoretic changes in plasma proteins, with Dr. D. W. Clarke; (2) effects of injecting bone marrow tissue, with Dr. E. A. McCulloch of the Departments of Medicine and Therapeutics; (3) effects of implanting bone chips, with Dr. A. W. Ham of the Department of Anatomy; and (4) effects of coincident oxygen poisoning, with Squadron Leader H. E. Roberts, R.C.A.F. Dr. D. G. Baker has investigated changes in the electrolyte levels in blood and electrolyte balances following X-irradiation, during exposure to cold and during prolonged exposure to gamma radiation. Mrs. O. J. Kalant has studied, in the adrenal glands, the activity of succinic acid dehydrogenase—one of the oxidizing enzyme systems in the tissue—and the alterations produced by hormones. There is a marked difference in this activity between the sexes. Dr. Sellers has demonstrated a lipoidosis of coronary vessels after long exposure to cold. This is the first time that a change in environment, without other interference, has been shown to produce this type of cardiovascular disease. With Dr. Rosemary W. You he has shown that when rats are exposed to cold the cholesterol levels in the blood increase, and that when the dietary cholesterol is increased under these conditions deposits of fat in the coronary vessels occur within six weeks.

In Dr. J. Campbell's section, studies on the role of the anterior pituitary gland in metabolism have been continued. With Mr. L. Chaikof and Mrs. V. Lazdins it has been shown that relatively small doses of the growth hormone obtained from this gland intensify diabetes in dogs, but that subsequent to these injections the insulin requirements are decreased. It has been shown also in co-operation with Dr. G. A. Wrenshall, Mr. R. Zemel and Mrs. Lazdins that the growth hormone can produce a pre-diabetic state in dogs, so that long after the injections have ceased and the animals are apparently normal, a permanent lesion of the insulin-producing cells of the pancreatic islets remains. The influence of adrenal cortical hormones on diabetes has been studied. Dr. Hassig, Dr. K. Aras and Dr. Campbell have carried out experiments directed towards the labelling of the insulin of the pancreas.

Dr. D. W. Clarke has studied in the isolated rat diaphragm the influence of potassium on the rates at which glucose is taken up and glycogen is formed. These rates are inhibited by high, and accelerated by low, concentrations. The rates are diminished by adrenal cortical hormones, but this effect is dependent on the presence of both potassium and sodium. A study of the amounts of glucagon that can be extracted from the pancreases of normal and of diabetic animals has been initiated in co-operation with Dr. Wrenshall and Dr. Bruce Casselman. A search is being made for a specific glucagonase in the liver. The sera of individuals in health and disease are being analysed by electrophoresis. The effects of radiation of rats upon the plasma electrophoretic patterns are being studied with Dr. Barlow.

Dr. J. Markowitz, with Dr. J. Archibald of the Ontario Veterinary College, has worked out a simple procedure for removing, transbuccally, the pituitary gland of the dog. The new feature of the method is the generous use of topical thrombin to prepare an almost bloodless exposure of the gland. The operation is simple and safe, and a coloured motion-picture of it has been prepared.

Dr. J. W. Scott has carried on an active programme of research and teaching in the Department, together with his clinical work in the Toronto General Hospital. He has co-operated with Dr. E. H. Botterell and Dr. W. M. Lougheed of the Department of Surgery, Dr. R. W. Gunton of the Department of Medicine and Dr. S. L. Vandewater of the Department of Anaesthesia in studying the clinical use of hypothermia, and has been aided in this by Mrs. M. J. Kerr who is determining the carriage of oxygen and carbon dioxide in blood and changes in blood constituents. An investigation of hypothelamic-pituitary interrelationships has been initiated in co-operation with Dr. C. Ezrin of the Departments of Medicine and of Pathology, Dr. Margaret F. Hill of the Department of Pathology and Dr. W. J. Horsey of the Department of Surgery. Dr. S. W. Schatz is carrying out experimental studies on the activities of the spinal cord. Dr. Scott is also investigating the regulation of temperature in the body, with Mr. Bernard Waltman. In co-operation with Dr. Best, the role of dietary choline on cholinergic synaptic transmission in the nervous system is being studied by Dr. Scott, Dr. R. J. Young and Mr. Jan Blumenstein. Mr. J. S. MacDougall has rendered valuable service in developing and maintaining the specialized electronic equipment used in these studies.

Graduate students have completed the following theses:

*For the M.A. degree:*

Tasker, R. R. Fat absorption and some of its related problems.

Webb, T. Some effects of the anterior pituitary growth hormone on the plasma proteins of dogs.

*For the Ph.D. degree:*

Baker, D. G. The effect of exposure to ionizing radiation and to low environmental temperature on electrolyte metabolism.

Hartroft, Mrs. P. M. Renal juxtaglomerular cells.

Munroe, J. S. Part I, The effect of growth hormone on plasma proteins and certain associated changes in blood and urine; Part II, Relation of blood sugar level to adrenal ascorbic acid.

Salter, J. M. Insulin as a growth hormone.

Sirek, O. Anterior pituitary growth hormone and the internal secretion of the pancreas.

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Kalant, O. J. and Sellers, E. A. "The Influence of Age and Sex on the Succinoxidase Activity of the Adrenal Gland of the Rat" (*Endocrinology*, vol. 55, Dec., 1954, pp. 777–81).

KINASH, B. and HAIST, R. E. "Continuous Intravenous Infusion in the Rat, and the Effect on the Islets of Langerhans of the Continuous Infusion of Glucose" (*Canadian Journal of Biochemistry and Physiology*, vol. 32, July, 1954, pp. 428–33).

——— "Effect of ACTH and of Cortisone on the Islets of Langerhans and Pancreas in Intact and Hypophysectomized Rats" (*American Journal of Physiology*, vol. 178, Sept., 1954, pp. 441–4).

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LAWRENCE, R. T. B., SALTER, J. M., and BEST, C. H. "The Effect of Insulin on Nitrogen Retention in the Hypophysectomized Rat" (*British Medical Journal*, vol. 2, Aug., 1954, pp. 437–9).

MONKHOUSE, F. C. "A Study of Some Aspects of the Problem of Controlling Heparin Levels in the Blood" (*Gynaecologia*, vol. 138, July, 1954, pp. 103–9).

——— "Physiological Factors concerned with the Removal of Injected Heparin from Circulating Blood" (*American Journal of Physiology*, vol. 178, Aug., 1954, pp. 223–28).

——— "An Investigation of the Coagulation Defect brought about in Rabbits and Dogs by the Intravenous Injection of Papain" (*Canadian Journal of Biochemistry and Physiology*, vol. 33, March, 1955, pp. 112–21).

RAPPAPORT, A. M., LOTTO, W. N., and LOUGHEED, W. M. "Experimental Hepatic Ischemia" (*Annals of Surgery*, vol. 140, Nov., 1954, pp. 695–710).

SELLERS, E. A. "Circulatory and Metabolic Factors"; in *Cold Injury: Transactions of the Third Conference, 1954*, pp. 29–49. New York: Josiah Macy, Jr. Foundation. 1955.

SELLERS, E. A., SCOTT, J. W., and THOMAS, N. "Electrical Activity of Skeletal Muscle of Normal and Acclimatized Rats on Exposure to Cold" (*American Journal of Physiology*, vol. 177, June, 1954, pp. 372–6).

SELLERS, E. A., YOU, R. W., and MOFFAT, N. M. "Regulation of Food Consumption by Caloric Value of the Ration in Rats exposed to Cold" (*American Journal of Physiology*, vol. 177, June, 1954, pp. 367–71).

# *Psychiatry*

*Under the direction of Professor A. B. Stokes*

*General Considerations*

A clinical department of the Faculty of Medicine is necessarily confronted by two problems of emphasis. First wise decisions are required in the division of a limited teaching strength between undergraduate and postgraduate training programmes: secondly, clinical services, teaching, and research must be developed in harmonious balance.

The two problems together emerge from a characteristic of medicine shared with but few other vocations: the art of practice, the science of inquiry, and the communication of both art and science to a new generation of physicians, are all functions of a co-operative fellowship warring against disability and disease. Within the fellowship, the new member, as he matures, moves from a position of more general attainment to more specific accomplishments as clinician (general or special), teacher, or researcher. All, at every stage, must be nourished by the University matrix with its ingredients subtly dispensed for universal growth.

Growth is a process in time. The application of diagnostic and treatment skills may be more or less immediate: the training of the skilled diagnostician and therapist takes at least a decade: the development of knowledge to allow its skilful application covers perhaps half a century. It is these differing rates of the various growth processes that make fostering a continuous unimpeded necessity.

Psychiatry, in terms of its fostering, has special difficulties. It is immature in knowledge development although poised for the emergence of specific contributions to therapy. The hopes of the future are too readily asserted in the present: the

notion of quick returns for monetary investments raises unfulfilled expectancies. Unlike other technically developed branches of medicine, project financing is not attuned to the growth need.

Yet project financing particularly through public grants is the main sustenance of the moment. In consequence clinical services are more expedient than effective, teaching is more impressionistic than realistic, and research is developed more on the good idea than on the proven fact. Long-term stable financing without thought of immediate gains is a pressing psychiatric need: the need is the greater in the face of the urgencies of human breakdown occasioned by nervous and mental troubles.

*Particular considerations*

The planning of a new psychiatric institute has progressed in limited degree over the past year. Although impediments to continued action have developed they are temporary and no doubt will be effectively resolved.

The graduate programme continues actively: there are 28 physicians in psychiatric training spread over twelve areas of assignment. An increase in the number of University fellowships has provided an opportunity for the development of teachers and research workers not tied to service contractual obligations.

Of those in graduate training, 14 were successful in the diploma examination. Of the diplomates of past years 12 were successful in the Certification examinations of the Royal College of Physicians and Surgeons of Canada.

The standard of the 1955 graduating class in Psychiatry was good: the Dr. Benjamin W. Appleton Prize in Psychiatry founded in memory of Dr. Benjamin W. Appleton was awarded for the first time.

Some additional appointments to the teaching staff have been made for 1956; the holders of these posts will strengthen the training assignments particularly in the general hospitals.

The small trust fund established for the development of psychiatry within the University continues to grow; thanks are due to the many subscribers who have shown their interest in this area of medical endeavour.

The R. Samuel McLaughlin Foundation and the McLean Foundation have each awarded a fellowship to graduate students prosecuting psychiatric studies in England. Generous help is gratefully acknowledged.

The Council of the Medical Faculty, the Academic Council of the Department, and the Medical Alumni Association have each continued in strong support of an expanding University programme. Colleagueship within the Department has been exemplary.

## Research

Research inquiries over the past year have continued to probe the physical, psychological and social aspects of human breakdown in living.

An expanding interest in the *neuroanatomical* basis of human reactivity has been represented locally in Dr. M. Sloane's laboratory. Progress has been slow and has suffered organizational difficulties, which are in the process of resolution.

*Physiological* studies of human development and reactivity continue under the direction of Dr. J. Lovett Doust. An examination of some aspects of capillary vascular physiology and morphology has revealed rich associations with mental events. Relationships with phasic disturbance of mental state, with hallucinatory experiences, and with changes in awareness (as in stuttered speech) have been uncovered by the exhibition of new techniques. Of necessity, these relationships have forced attention to wider aspects of respiratory and cardiac physiology in terms of variable reactivity over a time span. A better, in the sense of more precise, understanding of the effects of stress on the organism is emerging. Further work has been carried out on sensory rhythmic bombardment using not only visual flicker but also auditory and kinaesthetic sensory stimulation. *Metabolic* studies continue on the metabolic wards with special reference to the phenomena of periodic catatonia.

*Neurophysiological* studies, particularly on the alpha rate of the electro-encephalographic recordings, have been linked to the physiological and metabolic studies by Dr. J. E. Goodwin and Dr. A. Bonkalo. Following an investigation of alpha rate as a prognostic index of lobotomy success, an extension to the field of electro-convulsive therapy has been undertaken. The possibility of better choice of subjects for this treatment arises. In addition the effects of the new tranquilizing drugs on the EEG recordings are being actively investigated.

*Psychological* research is directed to improving the use and understanding of established psychological techniques and to developing new psychodiagnostic instruments. As to the former a study of the validity of the Rorschach test is being completed: as to the latter a complex sorting test is being developed for the better detection of intellectual impairment and a motor learning test is being structured to appraise flexibility in learning. The division has also participated in studies on the effects of tranquilizing drugs (Largactil, Serpasil and Frenquel) and on the behavioural outcome of the removal of enuretic symptoms in children.

A research programme in the field of *psychodynamics* has recently been initiated under Dr. D. Cappon. The point of departure in a very complicated area of inquiry is dream content and structure in patients suffering from physical disease. The dreams of tuberculous patients (with their fears of haemoptysis) and of cardiac patients (with their fears of dissolution) are examples of unexplored territories. The clinical issue is whether or not the dream anticipates the organ revelation of disease.

*Social* problems also focus research attention. The social service division through Mr. W. T. Lawson and Dr. T. J. Mallinson is evaluating the effects of group techniques in the rehabilitation of the mentally ill. Design and method are all important and have been the focus of much new thinking. Mr. Morton Teicher is directing a series of studies on the ecology of mental disease and is personally concerned with the comparative aspects of psychiatric illness as represented by wendigo psychosis among the Canadian Indians. Mr. Farrell Toombs and his colleagues are designing and implementing two studies in the field of interpersonal relations as they are revealed in a psychiatric setting. The first refers to the behaviour of persons (both staff and patients) involved in a psychiatric hospital ward; the second relates to the complex of behaviour involved in the development of the skill of a practitioner in psychological medicine.

Items of clinical research continue. Dr. K. G. Gray and Mr. Gordon Watson have followed up those persons admitted to the forensic unit of the Toronto Psychiatric Hospital five years ago. Dr. A. Miller and Dr. D. J. McCulloch have studied the clinical effects of the newer drugs in conjunction with the research laboratories. Dr. J. D. Armstrong has continued to investigate the problems of alcoholism.

Two areas of research, genetics and mental defect, are in the early stages of organization. The continuing obligation of psychiatric research remains as a focus for the best thinking. It is to delimit a problem and render it accessible to research techniques.

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Atcheson, J. D. and Williams, D. C. "A Study of Juvenile Sex Offenders" (*American Journal of Psychiatry*, vol. 111, no. 5, Nov., 1954, pp. 366–70).

Bonkalo, A. "Electroencephalographic Investigation in Lobotomy Study"; in *Lobotomy, a*

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BONKALO, A. and ARTHURS, R. G. *Facts about Epilepsy*. Mental Health Series, no. 1. Toronto: Department of Health, Ontario. 1954. Pp. 9.

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FARRAR, C. B. "I Remember Kraepelin" (*American Journal of Psychiatry*, vol. 111, no. 5, Nov., 1954, p. 379).

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STOKES, A. B. "Alcoholism Research—Clinical and Social Management" (*Alcoholism Research*, vol. 2, no. 1, Oct., 1954, p. 11).

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## *Radiology*

*Under the direction of Professor A. C. Singleton*

The teaching in the Department has been similar to that of the previous year, with extension of teaching in conjunction with other departments. The third-year didactic teaching remains unchanged, as does the clinical teaching of the final-year groups in Medicine and Surgery; participation in the postgraduate courses in Medicine, Surgery, Otolaryngology, and Ophthalmology has continued with considerable extension of postgraduate teaching in Obstetrics. The postgraduate teaching in Radiotherapy has been extended during the past year.

Seven candidates were successful in obtaining their diploma in Medical Radiology.

Museum facilities at the Toronto General Hospital and Sunnybrook Hospital have been further extended and improved.

### Research

Members of the staff have undertaken the following research work:

Dr. K. F. MacEwen, in conjunction with Dr. I. B. MacDonald, Department of Surgery, is conducting research into the correlation of radiological and surgical findings in gall bladder disease and, in conjunction with Dr. W. A. Dafoe of the Department of Obstetrics and Gynaecology, is conducting research on the function of the gall bladder during pregnancy.

Dr. K. E. Hodge, in conjunction with the Department of Obstetrics and Gynaecology, is conducting research in the method of determining the placental site and the diagnosis of foetal abnormalities.

Dr. O. B. Millar, in conjunction with Dr. John Bean of the Department of Obstetrics and Gynaecology, is conducting an investigation into the incidence and development of hydronephrosis in patients with carcinoma of the cervix uteri treated by radiation. Dr. Millar, with Dr. J. C. F. MacDonald of the Department of Radiotherapy, is continuing research in the use of radioactive colloidal gold. With Dr. W. K. Kerr of the Department of Surgery (Urology) and Dr. J. C. F. MacDonald of the Department of Radiotherapy, Dr. Millar is continuing the investigation into the use of Au-198 interstitially in carcinoma of the prostate.

Dr. C. L. Ash, in conjunction with Dr. N. C. Delarue of the Department of Surgery and Dr. W. T. Clarke of the Department of Medicine, is continuing the study of the effect of bilateral adrenalectomy and oophorectomy on advanced mammary carcinoma. Dr. Ash and Dr. M. Vera Peters are continuing the study of the use of hormonal therapy in carcinoma of the breast.

### Publications

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Hall, M. M. R. "Traumatic Rupture of the Kidney" (*Radiology*, vol. 63, Aug., 1954, p. 230).

Lobb, R. A. "Oesophageal Hiatus Hernia" (*Bulletin of the Academy of Medicine*, Toronto, vol. 28, no. 4, Jan., 1955, p. 94).

Millar, O. B. "Carcinoma of the Vagina" (*Journal of the Canadian Association of Radiologists*, vol. 5, June, 1954).

## *Surgery*

*Under the direction of Professor R. M. Janes*

The undergraduate teaching programme of the Department has continued on about the same level. The innovations introduced in recent years are on the whole working well. Beginning next session, final-year students will have one lecture daily and will be free during the remainder of the day to follow closely all activities of the clinical service to which they are attached.

There has been a considerable improvement in the facilities for research in the Banting Institute, but the space available remains inadequate and the possibility of completing the building in the rear as it was designed originally should be considered.

The training of surgeons under the aegis of the affiliated university hospitals continues, and places in the course continue to be sought from wide areas. The advanced graduate course, the annual course sponsored by the Medical Alumni Association, and activities made possible by the Kellogg Foundation were again well attended. A special course on cancer was offered by the Surgical Section of the Ontario Medical Association with financial assistance from the Ontario Division of the Canadian Cancer Society, and was well received.

The 1954 Balfour Lecture was delivered by Professor Robert Milnes Walker, Professor of Surgery in the University of Bristol, on "Portal Hypertension," and Professor Charles Robb of St. Mary's Hospital, London, lectured to the members of the staff, residents, and final year on the experiences at St. Mary's Hospital in reconstructing and replacing major vessels.

Plans are well under way for the establishment of a cardiovascular unit at the Toronto General Hospital, in conjunction with the Department of Medicine. This special unit will have facilities and personnel for conducting physiological studies upon patients with a view towards making more accurate the diagnosis of cardiac lesions, and, through studies conducted before and after operation, for judging the effects of surgery. More accurate and extensive follow-ups upon heart cases will be made possible. Dr. R. O. Heimbecker is being placed upon a full-time basis and for a few years will devote his time to research and clinical teaching.

At St. Michael's Hospital the new division of neurosurgery under the direction of Dr. Wm. Horsey is making good progress and the field of cardiovascular surgery is being covered by Dr. C. B. Baker.

Dr. Charles W. Harris has been promoted to the consulting staff of the Toronto Western Hospital and has been made a Graduate Lecturer in the University. Dr. J. L. McDonald has joined the consulting staff of the Toronto General Hospital and become a graduate lecturer in the University. The many years that each of these men has devoted to the University and to their hospitals is gratefully acknowledged. Dr. W. G. Bigelow has been made an Associate Professor, Drs. W. G. Carscadden, J. L. T. Russell, C. M. Spooner, C. H. Watson, and A. M. White have become Assistant Professors, and Drs. I. B. MacDonald, R. A. Mustard, and H. R. C. Norman have been advanced to the rank of Associates. Dr. I. B. Macdonald succeeds Dr. J. L. McDonald as head of the Division of Surgery at the Wellesley Division of the Toronto General Hospital. Dr. Neil Waters has been appointed to the surgical staff of the Toronto General Hospital, and attached to the Wellesley Division. This is an interesting appointment in that Dr. Waters has been brought back to a University appointment after two years' practice of surgery in Galt.

## Research

Dr. W. G. Bigelow, in co-operation with Dr. A. G. Gornall of the Department of Pathological Chemistry, Dr. F. W. Campbell, Dr. Brian Cookson, and Mrs. Patience Barrow, has continued the study of hibernation in relation to hypothermia. Under his direction Dr. F. W. Campbell is making a special experimental study of the influence of age upon the ability to tolerate low body temperature, and Dr. Cookson is studying the effect of certain drugs on the experimental hypothermic animal. Hypothermia is being used in clinical cases of cardiovascular disease undergoing operation and a study of the biochemical changes in the blood during hypothermia has been instituted.

Dr. E. H. Botterell and his associates are using hypothermia in the surgical management of intracranial aneurysms, and with the collaboration of Dr. Ramsay Gunton of the Department of Medicine, and Dr. Stuart Vandewater of the Department of Anaesthesia, and the advice of Dr. Bigelow, clinical and physiological studies are being carried out of the effects of hypothermia on neurosurgical patients. Dr. Botterell and Dr. F. P. Dewar are making a clinical assessment of the place of intervertebral body fusion following the removal of intervertebral discs.

Dr. W. A. Brown is studying the effects of Terylene implants in the rabbit.

Dr. Norman Delarue is continuing, in association with the Department of Radiotherapy, to study the effects of adrenalectomy in advanced cases of breast cancer.

Dr. A. W. Farmer continues his work upon burns.

Dr. W. R. Harris, in association with Dr. Kenneth Hobson, and in collaboration with Professor Arthur Ham of the Department of Anatomy, has been investigating healing after experimental separation of the femoral epiphsis and the regeneration of articular cartilage after experimental arthroplasty, and continuing the project on experimental fat embolism. He is also developing a suitable technique for micro-radiography of bone.

Dr. G. H. C. Joynt has conducted a study upon the effects of Dionosil and Dionosil "Oily" upon the lungs of dogs and has continued his work upon emphysema using a special valve.

Dr. James A. Key has continued attempts to supplement the coronary circulation in animals and hopes to apply the method to a suitable human case in the near future.

Dr. Wm. K. Kerr, in collaboration with Dr. Owen Miller and Dr. J. MacDonald of the Department of Radiotherapy, has begun an investigation of the distribution of radioactive colloidal gold in the prostates of animals and humans.

Dr. Wm. K. Lindsay is continuing the study of tendon function and repair using chicken legs. With the assistance of Dr. D. Bowden of the Department of Pathology at the Hospital for Sick Children, histological techniques have been improved. In collaboration with a team of workers through the Research Institute at the Hospital for Sick Children, a detailed investigation into all aspects of rehabilitation of cleft palate and cleft lip cases is being pursued.

Dr. Ian B. Macdonald, with the assistance of Dr. H. Weizel, has continued the work upon homologous renal transplants in dogs.

Dr. T. P. Morley, in association with the Department of Neuroanatomy, has instituted a study of the growth of intracranial tumour tissue in cerebrospinal fluid *in vitro*. Experience is being gained in cell morphology under conditions of tissue culture and a comparison is being made between the living and fixed stained tissues.

Dr. Wm. T. Mustard and his associates continue to study extracorporeal circulation and are doing an investigation of an extracorporeal circuit with low flow rates. In May of this year the first human was operated upon successfully using this technique of extracorporeal circulation and a monkey lung as an oxygenator.

Dr. R. A. Mustard, with the assistance of Dr. Olive Ibberson, has completed the first stage of investigation of use of radioactive gold in tracing lymphatics in dogs, and hopes to extend the work to humans in the near future. He also has been conducting a survey of all cases of oesophageal cancer treated at the Toronto General Hospital.

Dr. E. B. Tovee has continued research on fractured necks of femur in dogs.

In association with Dr. J. W. Scott, Drs. C. Ezrin, M. Hill, and Wm. Horsey have perfected a technique of producing hypothalamic lesions in the cat and monkey as a preliminary step in a proposed study of hypothalamic-pituitary function. Dr. Stanley Schatz has made a study of synaptic transmission in the hypothermic spinal cord of the cat and has completed a study on the motility and sensation of the upper gastro-intestinal tract in normal and in paraplegic patients.

Dr. D. R. Wilson has been investigating various types of arterial homografts and different types of nylon prostheses.

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——— "A Career in Surgery—Dr. Norman S. Shenstone" (*Ontario Medical Review*, vol. 21, 1954, p. 338).

——— "The Treatment of Soft Tissue Injuries: Protective Strapping for Sprains of the Medial Collateral Ligament; Protective Strapping for Low Back Injuries; Injuries of the Neck; The Immediate and Late Strapping of Acromioclavicular Joint Injuries; Protective Support for Muscle Strains and Contusions; The Immediate and Late Support of a Dislocated Glenohumeral Joint" (*Ontario Medical Review*, vol. 21, 1954, pp. 344, 390, 627, 696; vol. 22, 1955, pp. 43, 97).

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——— "Facial Injuries" (*Ontario Medical Association Review*, vol. 21, no. 9, Sept., 1954, p. 556).

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## *Therapeutics*

*Under the direction of Professor K. J. R. Wightman*

The clinical assistants responsible for giving the fourth-year demonstrations in Therapeutics this year were Drs. H. A. Pickard, W. G. Grant, and W. J. K. Simpson. These demonstrations, which are given to a quarter of the class each term, are as practical as they can be made, and appear to serve a useful purpose. An objective multiple choice examination paper has been devised and is under more or less continuous revision; it is hoped that it may eventually find a use in further validation of the students' term marks. The pattern of instruction in the third medical year has not been altered. Dr. G. Hart has been extremely helpful in the preparation for weekly theatre clinics, and some of the lectures have been given by Dr. M. A. Ogryzlo of the Department of Medicine and the various members of the staff in Neurology of the Department of Medicine.

### RESEARCH

Members of the staff have carried out the following research work:

Dr. E. A. McCulloch, who is a research fellow of the National Cancer Institute of Canada and holds an appointment in the Department of Medicine, has been studying various aspects of leukaemia under the supervison of the Head of the Department of Therapeutics. In collaboration with Dr. R. C. Parker, tissue cultures of normal and leukaemic leucocytes derived from bone marrow and peripheral blood have been established and maintained for periods up to ten months at the time of writing. Morphologic and immunologic studies of these cells are in progress. Long-term cultures of this type have not been achieved before, and this work is very promising.

Since bone marrow injections appear to exert a protective effect against radiation injury and development of leukaemia in susceptible strains of mice following radiation, an experiment to study the effect of tissue cultures of marrow in this regard has been begun in collaboration with Dr. E. A. Sellers and Dr. J. Barlow of the Department of Physiology.

In addition, material for electron microscope investigation of these cells is being obtained for Dr. Allan Howatson of the Department of Anatomy.

Work with radioactive phosphorus as a metabolic tracer in this group of diseases, initiated by Dr. C. J. Bardawill and Miss A. Britten several years ago, has been continued and expanded. Because of our interest in the effect of adrenal steroids and growth hormone in leukaemia, this work has become more endocrinological than haematological. Growth hormone has been found to depress

the rate of accumulation of phospholipid in the plasma and a similar, but more marked, effect is found in patients with acromegaly. This has led to an investigation of the influence of other hormones on this function, and an interesting relationship between thyroid function and the rate of disappearance of the trichloracetic-acid-soluble fraction of plasma phosphorus (which is a precursor) has been discovered.

Dr. Gerald Hart, Fellow in Therapeutics, has taken an active part in all the research activities of the Department and in addition has continued the previously reported work in immuno-haematology. He has also assisted with Dr. Spaulding's investigation of cat scratch fever and the continuing work on steatorrhoea, plasma amino acids and red cell arginase in leukaemia. A preliminary experiment with myelokentric acid in relation to Hodgkin's disease was carried out but the results were inconclusive.

In conjunction with the other members of the staff in Haematology, in the Department of Medicine, continued study of the action and application of various chemotherapeutic drugs in leukaemia and lymphoma has been carried on. In the past year demecolchicine, mnyleran, tri-ethylenethio-phosphoramide and 6-mercaptopurine have been studied in addition to the older group of drugs. Studies with ACTH, cortisone, metacorten and radioactive phosphorus as therapeutic agents have also been continued.

## *Physical and Occupational Therapy*

*Under the direction of Dr. A. T. Jousse*

Mrs. Jacqueline Jefferies and Miss Moyna J. Gordon have resigned from the teaching staff. Mrs. Jefferies, after four years, is returning to Britain. Miss Gordon will go on to Edmonton to join the staff in Physical Therapy. Miss Rendell, who had been appointed to the staff at Toronto last year, resigned to go to Edmonton in September 1954. One of these vacancies will be filled by Miss Ruth Bradshaw, who this year completed her Teachers' Training Course.

Dr. Monkhouse was not available for the instruction in Physiology, and this work was very capably handled by Dr. W. G. B. Casselman and Dr. J. C. D. Barlow. Dr. John S. Crawford became associated with the course when he accepted the appointment of Assistant Director.

With the opening of a course in Physical and Occupational Therapy at the Université de Montréal in December 1954, further demands were made on our teaching staff. Dr. Gingras, the Director, was unable to obtain a full complement of teachers in Physical Therapy, and it was arranged, therefore, that certain of our teachers would visit Montreal for a three-day period each month in order that the instruction of the first year might go forward. At the end of the Easter Term one of our teachers instructed full time in Montreal during May and June. Only in this way could the course of instruction for French-speaking students be undertaken.

The World Federation of Occupational Therapists held its annual meeting at Edinburgh in August 1954. The Senior Lecturer in Occupational Therapy, Miss Helen P. LeVesconte, presented a paper on "Some Aspects of Rehabilitation in Canada," and Mrs. Thelma Cardwell attended as the official delegate for Canada. Miss Marjorie Spence attended meetings in Washington at the end of May preliminary to the World Conference of Physiotherapy to be held in New York in 1956.

The final enrolment in the first year was 88, and 75 graduates received their diplomas on May 24th. The total enrolment was 256. The graduates of this year accepted appointments from coast to coast. There were three young women taking the Teachers' Training Course in Physical Therapy. One has completed her training this term, and two were enrolled in the first year. One Occupational Therapist was registered as an Occasional Student in order that she might obtain skill and knowledge in the field of Physical Therapy, and thus practise as a combined therapist.

## *Committee on Experimental Research*

*Reported by Professor J. D. Hamilton*

Since the Banting and Best Department of Medical Research vacated the Banting Institute, the administration of the research facilities common to all departments in the Banting Institute has fallen on the Committee. The appointment of Professor R. C. Ritchie as assistant to the Chairman has proved a tremendous help. Dr. Ritchie has given freely of his time, and the improvements made during the past year are entirely due to his initiative and supervision.

The animal quarters on the sixth floor especially had become grossly inadequate for the volume and variety of research which has developed in recent years. As it was impossible to acquire additional space, an attempt has been made to modify the existing quarters by removal of partitions and altering existing rooms. Within recent months, two rooms have been refinished and equipped for air conditioning units. One room has been adapted to the care of monkeys. One room has been modified to accommodate dogs receiving radioactive isotopes. To care for the increased numbers of animals, a senior animal attendant has been added to the staff. Much more needs to be done before the animal accommodation is all that it should be, but it is a pleasure to report that progress is being made.

On the fifth floor, the modifications made last summer through a special grant from the University have greatly facilitated operative procedures and post-operative care. There are now two operating rooms with a total of four tables, a central utility room, and two recovery rooms.

Despite the building modifications, we were desperately in need of new cages, and equipment for the operating and recovery rooms. Through the aid and co-operation of the Department of Health of the Province of Ontario, a capital grant in the sum of $36,000 was obtained as a National Health grant-in-aid. This has permitted the installation of new animal cages on the sixth floor, and of an air conditioning unit in one room. Operating tables, lights and cabinets have been acquired for the operating rooms, and a new X-ray machine has been installed. To facilitate tissue culture investigations being conducted in three departments, various pieces of apparatus have been obtained, including that necessary for central glass washing.

The administration of the common research facilities has proved to be a difficult problem, in that support must come not only from the University, but from research grants to a number of different individuals. The setting up of a unified system of charges for animal care, and a relatively simple method of transferring funds, has finally been achieved. This would not have been possible without the patience and generous co-operation of Mr. Reid, the Chief Accountant.

The available facilities, and the personnel, five in all, are being taxed to the limit at present in an effort to keep up with the various research projects. If research in the Banting Institute continues to develop, then additional space must be acquired, not only for animals, but also for fellows and technicians.

## *Banting and Best Department of Medical Research*

*Reported by Professor Charles H. Best*

Professor C. C. Lucas, Dr. Jessie H. Ridout and Professor Best have continued their studies of the effects of choline and its dietary precursors on the liver, and other workers have extended the study to other organs. Further work has been done on the effect of different levels of dietary protein on the deposition of stainable fat in the liver cells. They have also studied, with Professor W. S. Hartroft, the cure of dietary cirrhosis in rats. When the liver lesions were not too advanced, choline reduced the fatty infiltration, improved the gross and histological appearance of the liver, and accelerated regeneration of liver cells. When the lesions were very severe, life was prolonged by choline but the repair was minimal.

Dr. Jean M. Patterson has assisted with a comparative study of the effects of supplementary choline and of methionine on the concentration of cholesteryl esters in the blood serum of rats. Dr. Robert J. Young has extended his studies on the role of betaine in lipotropic phenomena to include guinea-pigs and rabbits, species hitherto difficult to work with because of their unwillingness to eat purified and semi-synthetic diets. Dr. Young is studying a muscular dystrophy produced in rabbits by choline deficiency. Mr. R. J. Gillespie is conducting further experiments on the relationship of the intake of alcohol by animals to the production of fatty livers and cirrhosis. Mr. K. K. Govind has studied factors influencing synthesis of choline in the body by determining the choline content of the whole carcass of rats fed different semi-synthetic diets.

At the end of August, 1954, Dr. Hartroft left the Department to become Mallinckrodt Professor of Pathology at Washington University, St. Louis, Missouri. Since then the section for Experimental Pathology and Histochemistry has been under the direction of Dr. Bruce Casselman.

Dr. Casselman has been continuing his cytological and histochemical studies of the tissue changes induced by dietary deficiencies of choline, the essential fatty acids, the biological antioxidants and proteins. Dr. Anka Sirek has been correlating the cyclic histochemical and morphological changes in the testis of normal rats as well as the disturbances in these processes induced by nutritional deficiencies. Further studies on the influences of Vitamin $B_{12}$ and biological antioxidants upon the cirrhosis and the deposition of ceroid pigment in the livers of choline-deficient rats have been carried out by Dr. Vincent Colapinto. Other nutritional and environmental factors affecting the development of various lesions in such rats were studied by Mr. Jan Blumenstein. New staining techniques developed by Mr. W. Wilson, working in collaboration with Dr. C. Ezrin of the Department of Medicine, promise to be important contributions to the investigation of adenohypophysis and the neurohypophysis. The section has continued to serve other members of this department and of the Department of Physiology by preparing more than 10,000 tissue sections. Dr. Rosa Rappaport examined many of these and provided detailed histological reports to the investigators concerned.

Studies on the pancreas by Dr. Gerald Wrenshall and his group have included a survey of the extractable insulin, fat, water and fibre content of the human pancreas and correlation of these findings with skinfold measurements of body fat and clinical histories. Additional factors now under study include special histological observations on islet cell fat and alpha cells with Dr. Casselman and Mr. Wilson, and on pancreatic glucagon with Dr. D. W. Clarke.

Two inter-university studies are in progress, one between Harvard and Toronto and the other between Minnesota (Mayo Clinic) and Toronto. In the former, the effects of pituitary growth hormone on the insulin and glucagon extractable from the pancreas of mice with the obese hyperglycemic syndrome and of their non-obese sibs as controls, are being studied. The effect of hypophysectomy on the insulin extractable from dog pancreas represents the basis of the latter study.

The basis was developed earlier for rate measurements in compartments where uniform mixing of the factor under study does not occur. Mr. H. Schachter has found this workable in hydrodynamic systems. Self-consistent transfer rates and compartmental sizes for total phosphorus have been measured throughout the living rat by Mr. L. C. Lax, Mr. S. Sidlofsky and Dr. Wrenshall. Miss M. Henderson has found that insulin adminstered intravenously to the depancreatized dog lowers the plasma glucose level by causing a marked and rapid increase in the rate of plasma glucose disappearance, and a slight decrease in the simultaneous rate of its new appearance.

A metabolimeter developed here for the total recovery of a metabolic factor and its products is being employed by Dr. F. Gerritzen to measure $O_2$ intake and $CO_2$ output rates in the hypophysectomized rat.

Previous work carried out by Dr. J. M. Salter with Professor Best has shown

that insulin will promote protein synthesis in the absence of the pituitary gland. Mr. I. W. Davidson and Dr. Salter have investigated the extent to which the protein anabolic action of insulin and of growth hormone are dependent upon an increase in caloric intake. Certain aspects of the synergism between insulin and anterior pituitary growth on growth and protein synthesis have also been investigated.

Dr. George Wilgram with Professor Best extended previous studies on the cardiovascular system in choline-deficient rats. It was found that cholesterol supplements and simultaneous injections of growth hormone and testosterone greatly increase severity and incidence of lesions in the coronary arteries and aorta. Lipoprotein studies showed all lipid fractions to be decreased in the serum of choline-deficient rats although they show marked vascular lesions. A seborrhoea-like syndrome was experimentally produced in choline-deficient rats. Preparations for the establishment of a monkey colony to study the effects of choline deficiency in this species have come into a final stage.

Dr. Bruno Rosenfeld and Miss Jessie Lang have been extending their investigations on the influence of choline deficiency upon the level of phospholipids in the serum of rats. They have found that dogs likewise showed a decrease of serum phospholipids as well as serum cholesterol when fed a hypolipotropic diet. *In vitro* studies with normal rat liver slices showed a higher rate of oxidation using labelled palmitate as a substrate as compared with liver slices from choline-deficient animals. On the other hand, fatty acid synthesis with rat liver slices using labelled acetate as a substrate did not appear to be influenced by hypolipotropic diets.

Experiments were continued by Dr. A. M. Rappaport with Dr. G. Y. Hiraki and Dr. Rosenfeld to study the effects that arterial autoperfusion of an ischemic necrotic liver has on the rate of detoxication of pentothal. Arterial autoperfusion was accomplished by drawing blood from the animal's own arterial system and pumping it through an extracorporeal circuit into the portal vein. Histochemical analysis of the perfused livers showed a definite decrease in fat content of the cells as compared with the unperfused ones. These findings were correlated with the values obtained through chemical fat analysis of the hepatic tissue before and after arterial autoperfusion. Dr. Lucas and Dr. Patterson co-operated in this investigation of the problem of fat phanerosis. The liver acinus was studied in the normal human liver. The application of the acinar concept to human histopathology has proven most fruitful. The physiological changes of the portal pressure in animals with normal and altered portal circulation have been observed and recorded on a coloured film strip. The pressure changes in the portal vein were compared with those in the superior and inferior venae cavae. Preliminary experiments were carried out with Professor M. A. van Bouwdijk Bastiaanse, Head of the Department of Gynaecology and Obstetrics, University of Amsterdam (Holland) in order to reproduce the phenomena of eclampsia. Ischemia was induced in the uterine arteries of pregnant dogs by means of a gradual constriction of the abdominal aorta and was followed up by aortography.

Dr. W. J. Linghorne, assisted by Mrs. Joan Ashdown, is continuing his research on periodontal disease. The factors concerned in the regeneration of supporting structure of the teeth lost through this condition are being investigated. Successful reattachment and regeneration of lost supporting structure in dogs has been attained under experimental conditions closely simulating those encountered clinically in periodontal disease.

Dr. Linghorne and Dr. I. Macnab are studying basic mechanisms in the repair of bone. They have succeeded in growing bone in a polyethylene tube without the use of grafts. This method is proving a useful research tool for studying the manner in which bone is repaired, the role of cartilage formation in the repair of bone, the part played by detached periosteum in bone repair and the way in which grafts of various types aid osteogenesis.

Dr. Otakar Sirek with Professor Best has investigated the influence of the adrenergic blocking agent Dihydroergotamine (DHE) on short-lasting hyper-

glycemic effects produced by anterior pituitary growth hormone. They have shown that the injection of growth hormone tends to stimulate adrenergic activity because the rise in blood sugar which occurs immediately after a single injection of the hormone into a diabetic dog can be prevented by simultaneous treatment with DHE. They have also shown that the hyperglycemic factor which occurs in the blood of the pancreatico-duodenal vein of animals treated with growth hormone is not identical with glucagon but seems to be closely related to adrenaline. Dr. Sirek will continue his research work in the Hospital for Sick Children.

In cancer research, Professor W. R. Franks, with the assistance of Mr. John Skublics, Miss M. M. Shaw and Miss A. McGregor, has extended the work on exploring the possibilities of radiation chemotherapy of tumour. The aim of this approach is to produce locally a chemotherapeutic agent by radiation-chemical change induced in systemically administered non-toxic precursor. A number of chemical substances have been tried with varying success, the combination of oxygen with various halide-alkyl derivatives being the most promising. A number of fluoro-alkyl derivatives have been supplied by Dr. F. L. M. Pattison for test, and at the present time sulphur hexafluoride appears possibly promising, since by the loss of an atom of fluorine a product with the desired toxicity ratio is obtained. From this work it has become obvious, however, that the destruction of 99.9 per cent of the cancer cells is not enough. The natural selection of tumour growth is towards increasing malignancy, a lack of host resistance being an essential characteristic of the disease.

Dr. Roy Bather has rejoined Dr. Franks' group as a British Empire Cancer Campaign Exchange Fellow; in extending previous work which showed that the metamorphosing hormone thyroxine reduced the carcinogenic activity of chemicals, it has become evident that the carcinogen conversely shows an anti-thyroxine effect. We are indebted to the Bray Chick Hatcheries for generous assistance in the virus phase of the work, and to the National Cancer Institute of Canada for support of the programme generally.

Dr. Franks' section is also active in the field of accident investigation and prevention. Under the auspices of the Defence Research Board and with the cooperation of Mr. Charles Lennox, a method has been evolved of detecting the presence of hypoxia as a factor in aircraft accidents. This has been adopted by the R.C.A.F., the U.S.A.F. and other allied air forces. The method is generally applicable to the post-mortem detection of asphyxia.

With Mr. G. A. Meek, the nature of the forces necessary to produce injury to the body is being determined by the development of a cheap, simple accelerometer which records the acceleration, its duration, direction and rate of change. No attempt is made to calibrate the (microscopic) unit except following an accident; it becomes economically possible, therefore, to distribute the button-sized instrument at random in structures, clothing, etc. It is surprising how much of the body can tolerate even major accidents. By measuring these conditions for survival it is hoped to extend them to the body as a whole.

In the sub-department of Synthetic Chemistry under the direction of Professor Erich Baer, the synthesis of naturally occurring phosphatides and the elucidation of their structure has continued. Dr. D. Buchnea completed his work on the synthesis of L-alpha-(dioleyl) lecithin and studied some of its physical and chemical properties. The possibility of a more efficient synthesis of saturated lecithins by a method that has been recently developed for the synthesis of unsaturated lecithins is being investigated by Dr. Buchnea. Dr. J. Maurukas, after accomplishing the synthesis of phosphatidyl serine and the elucidation of the structure of ox-brain phosphatidyl serine, directed his efforts towards the synthesis of phosphatides containing peptide moieties. L-alpha-(distearoyl) phosphatidyl L-serylglyclyglycine, the first synthetic phosphatidyl peptide, was obtained. Dr. H. C. Stancer developed a synthetic procedure that yields a purer phosphorylethanolamine that can be obtained by the older methods. Using radioactive glucose, he is investigating also the possibility that

the glycerolphosphatides are synthesized biologically from L-alpha-glycerophosphoric acid originating in the carbohydrate cycle. The synthesis of choline-containing plasmalogens is being undertaken. Mr. J. Ciplijauskas has developed a method for the synthesis of vinylphosphate which we expect to be an unrecognized intermediate in carbohydrate metabolism and in photosynthesis. An evaluation of synthetic L-alpha-(dimyristoyl) lecithin as antigen component in the serodiagnosis of syphilis, which had been carried out in past years in various laboratories in Canada, the United States, England, France, Denmark and Norway, has now definitely established its superiority to natural lecithin. Mr. F. Martin and Mr. H. H. Flehmig have assisted the various members of the Department in their research.

Mr. C. R. Cowan's contributions in connection with establishing efficient working facilities in the new Institute cannot be over-emphasized. His advice and active assistance in many of the research problems continue to be invaluable.